

MAY, 1945

# Manpower Efficiency Number

*Better Utilization of Mining Manpower for  
Wartime Tonnage and Peacetime Progress*

KEEPING "SOAP-CAKES"

OUT OF CAR-BEARINGS



## SUN MINE-CAR LUBRICANT...

**Stays Soft, Eliminates 88% of Car-Lubrication Jobs, Cars Roll Easily**

Hard, soapy deposits were caking-up on the bearings of the cars in a mine, so that they had to be greased every two weeks.

**The miners complained** constantly because cars were so hard to move. They squirted oil on the bearings, but got only temporary relief.

**To lick this problem**, the mine management called in a Sun Engineer, who studied the problem and recommended one of Sun's specially prepared mine-car greases.

**The results:** Sun grease stays soft. No oil has to be added. Cars are easy to move, even when outside the shaft in zero weather. Complaints stopped.

**Wheels are lubricated** now on a basis of months, instead of every couple of weeks, eliminating 88% of the car-lubricating jobs formerly necessary.

**In every part** of your mine, wherever you have trouble with lubrication, in powerhouse, air-systems, hoists, conveyors, mining and loading machinery, railroad equipment, and tipples, the experience of Sun Engineers, plus the quality of Sun petroleum products, can help to cut down unnecessary expense and delay. Call in the Sun Engineer in your neighborhood. Or write to . . .

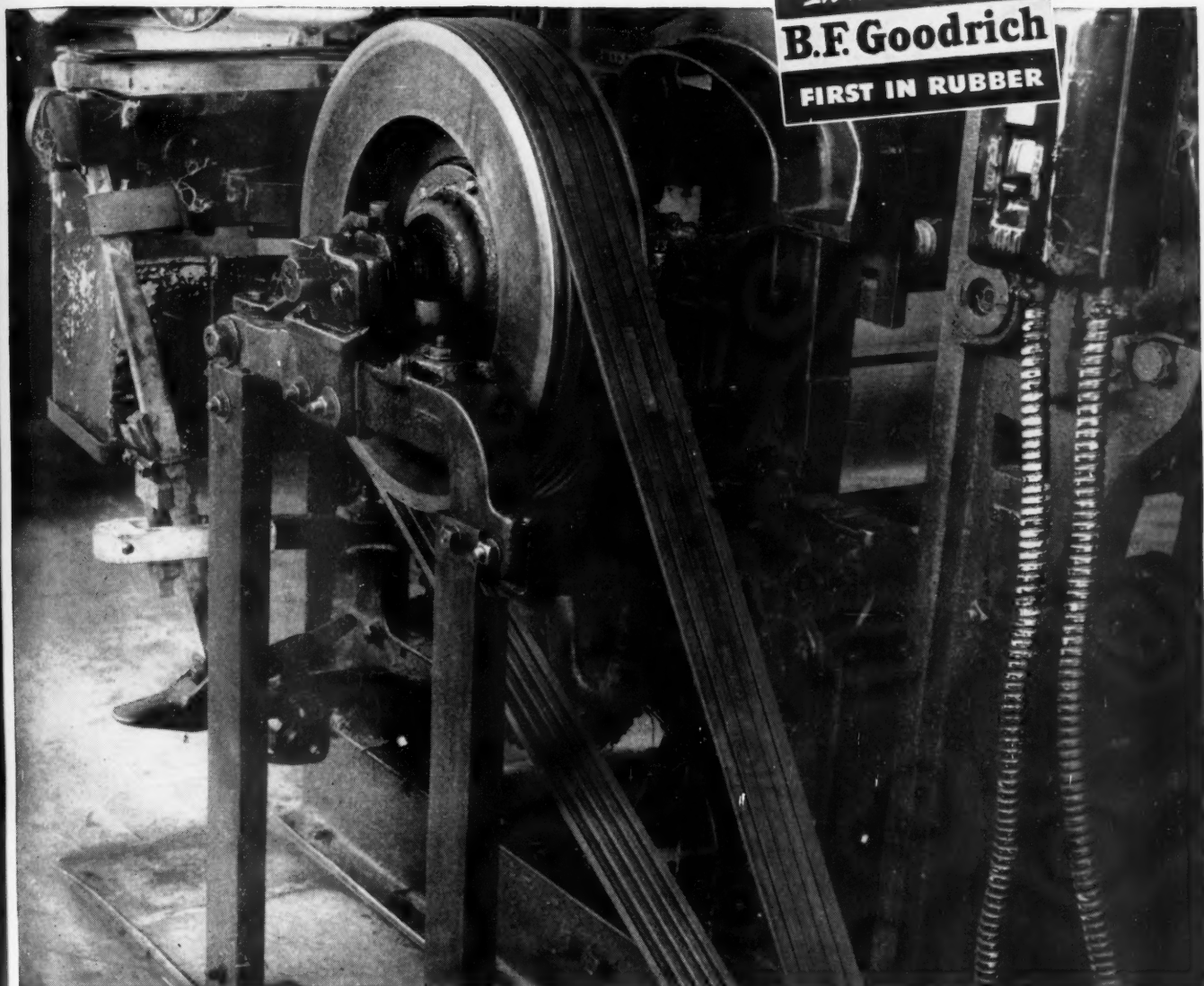
**SUN OIL COMPANY • Philadelphia 3, Pa.**  
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas



# SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY





## B.F. Goodrich multiple V-belt drives here outlast gear drives 4 to 1

*Successful experience in textile loom service points way to increased industrial use*

FOR years, textile men said that V-belt drives couldn't be used on heavy duck looms. And they were right—until recently. The low-stretch, non-resilient V-belts of a few years ago couldn't meet the demands of this severe and exacting service. They were all right for spinner or twister frames—but not for looms.

Then B. F. Goodrich developed the shock absorbing, resilient, high flexing V-belt that is known throughout industry today. Six years ago loom tests

were begun. Since then, B. F. Goodrich multiple V-belt drives have proved in actual service that they offer the following distinct advantages over gear drives for textile looms:

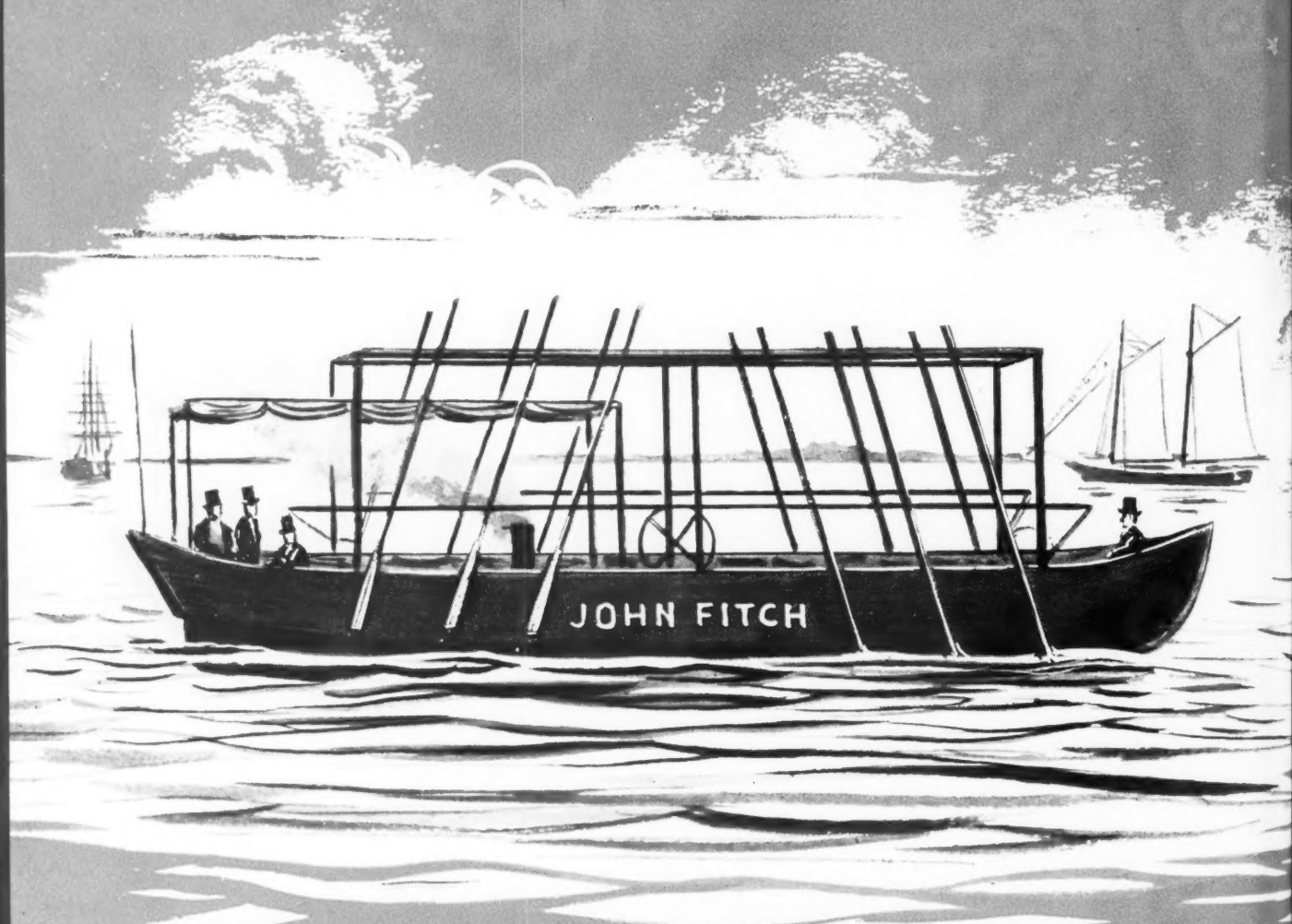
1) *Average gear life, 6 months; average V-belt life, 2 years.* 2) *Sharply reduced maintenance time and costs.* 3) *Smoother operation of the delicate looms.* 4) *Reduced noise.* 5) *Reduced time and cost for replacement.* 6) *Shock absorbing qualities not present in positive transmission.* 7) *V-belts absorb peak loads, save and extend*

*life of loom parts.* 8) *A quick and cheap way of changing loom speed by using a variable pitch pulley.*

Your B. F. Goodrich distributor will be glad to translate these *proven* advantages into terms of your own power transmission needs. Or if you have any other problem involving the use of rubber, the chances are that it can be solved by one of the 32,000 B. F. Goodrich rubber products. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

**B. F. Goodrich**  
RUBBER and SYNTHETIC products

*to do one thing and do it*



John Fitch's boat, propelled by steam, with six paddles on each side, made its first public trip August 22, 1787, on the Delaware River, at Philadelphia. Improved in 1790, it was the first American steamboat to carry passengers on regular trips.

Hulburt's Quality Grease, made in Philadelphia, is another important first—the first, and only, grease made solely for lubricating coal mine equipment. For 25 years it has been on the preferred list of mines who have learned, through use, Hulburt Grease means QUALITY.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

*Specialists in Coal Mine Lubrication*



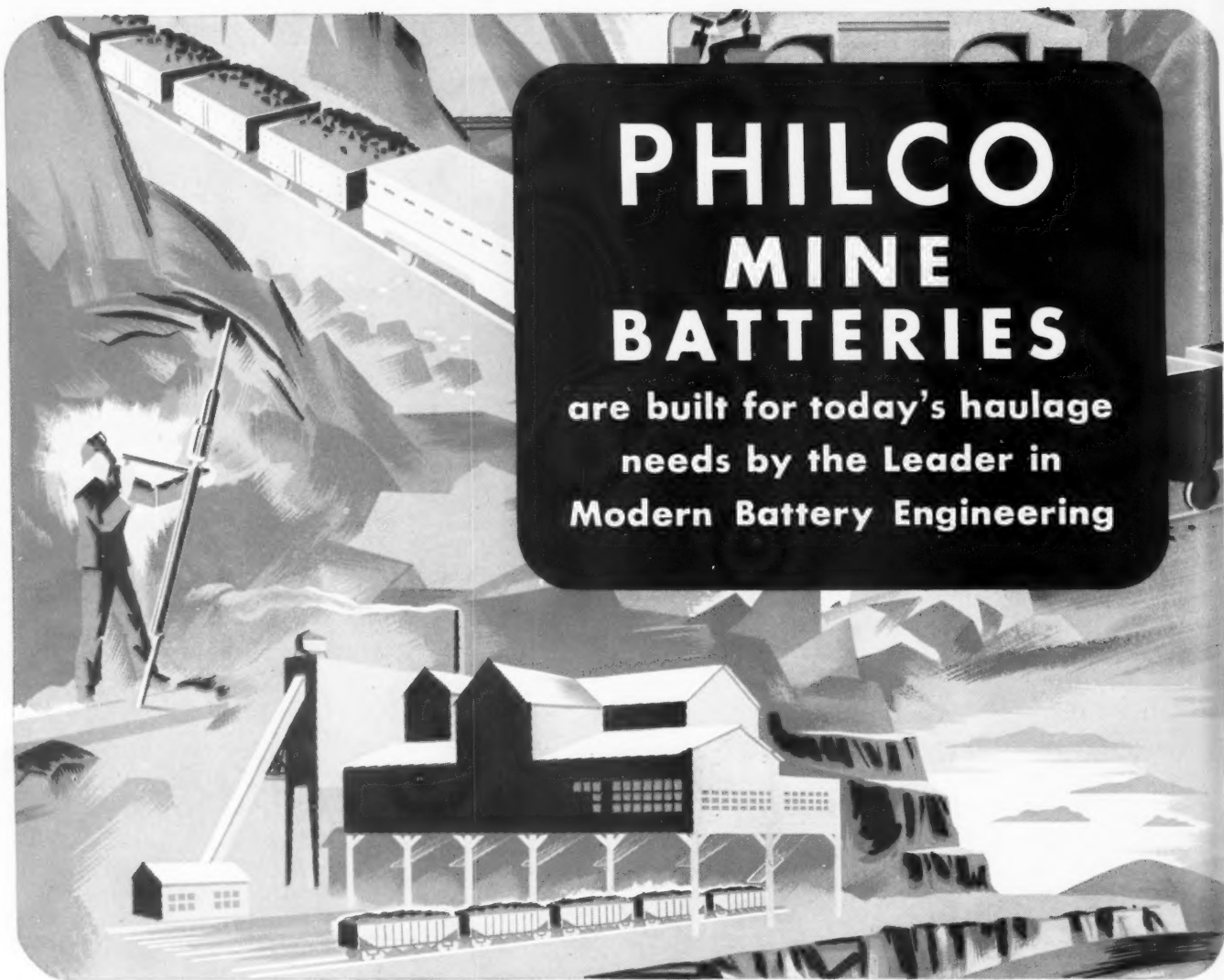
**SUPREMACY WELL**



**HULBURT**

*Quality* **GREASE**



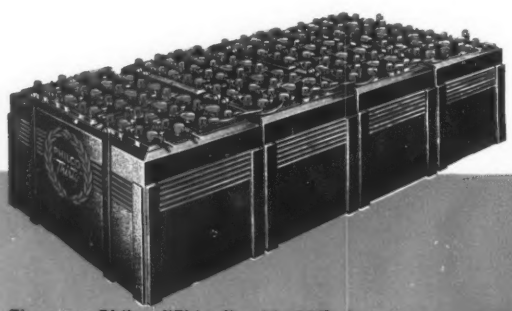


**PHILCO  
MINE  
BATTERIES**  
are built for today's haulage  
needs by the Leader in  
Modern Battery Engineering

**NOW—ANOTHER PHILCO "FIRST"**

Newest of the long series of major storage battery developments pioneered by Philco, is the revolutionary new Philco "Thirty," that gives 30% longer life. Here is the battery for your toughest mine haulage jobs—now and after the war. It gives you the capacity to haul maximum tonnage day after day, with your locomotives and shuttle cars. And because of its 30% longer life, with lower depreciation and maintenance costs, Philco "Thirty" will save you money. Increasing quantities are now available for current deliveries. Write for information. **PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.**

For 50 years a Leader in Mine Storage Battery Development



The new Philco "Thirty" with 30% longer life is identified by its distinctive red top.



Modern Philco Shuttle Car Batteries provide high capacity with proven long life.

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# Coal Age

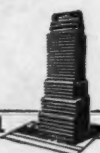
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Director of Circulation

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Please change the address of my COAL AGE subscription as follows:

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**LONG LIFE and FLEXIBILITY**

**in HAZACORD  
PORTABLE MINING CABLES**

**L**ONG LIFE is only a comparative term as applied to mining machine cables because of the punishment inflicted upon the jacket by the constant scraping and pulling around corners, over switch latches, and across mining floor rubble.

Hazacord Portable Cables are designed to withstand such hard usage by:

Extra flexibility of conductors, making cables limp and easy to handle. For No. 8 to No. 2, 133 wire strands is standard, although finer stranding is available.

Extra firm, strong, synthetic rubber insulation on

each conductor. High tensile strength reduces to a minimum any tendency to "short" under abuse.

Extra tough, resilient, tear-proof, reinforced, synthetic rubber jacket, vulcanized in continuous metal molds, gives a smooth finish, density and an exceptionally high tensile strength.

Modern composition and processing combine to give greater toughness, strength and longer life to Hazacord Cables.

Send for the 48-page Hazard Mining Catalog — No. 179. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

**HAZARD**

**INSULATED WIRES AND CABLES**  
for every mining use



3780





**PUSH TONNAGE UP - PULL COSTS DOWN**

**7** ndustry and SFA experts agree: a coal mine that can't produce at low cost won't make the grade in the postwar buyers' market.

Start now to solve tomorrow's problems as well as today's—retool for better, faster blast holes with **COALMASTER** Drilling Tools. From thread bar to drill bit, they are engineered in matched sets to drill straighter, cleaner holes in record time—with less power, less strain, more safety.

To ease your manpower shortage now and to keep competitive after V-Day, retool with **COALMASTER DRILLING TOOLS**



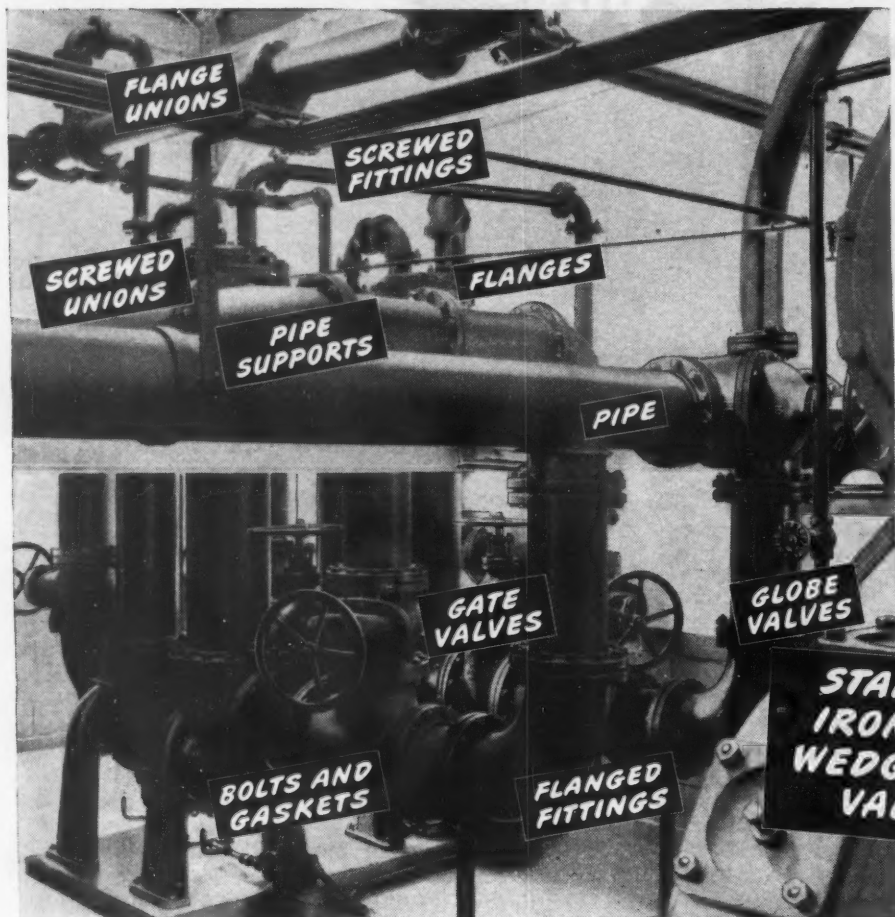
**CENTRAL MINE EQUIPMENT CO.**

ST. LOUIS 8, MO.

# CRANE CAN SUPPLY IT

## ... Whatever You Need in Piping Materials

ONE SOURCE OF SUPPLY  
ONE RESPONSIBILITY FOR ALL PARTS  
ONE STANDARD OF QUALITY



Aftercooler hook-up

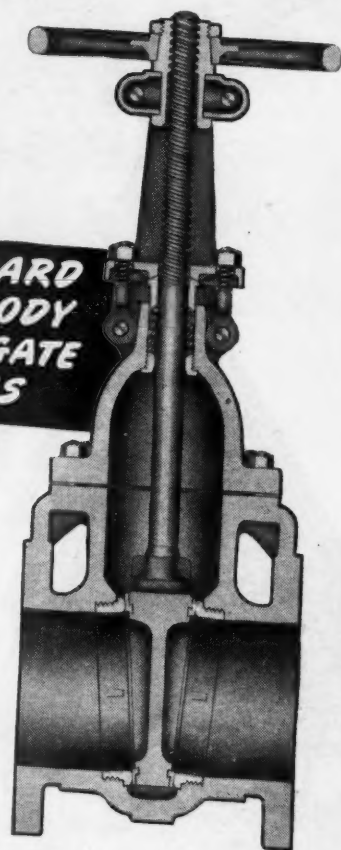
**SERVICE RECOMMENDATIONS:** Crane Standard Iron Body Wedge Gate Valves with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S. & Y. and Non-Rising Stem patterns.

### Working Pressures

Size of Valve	Screwed or Flanged End Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

\*For steam lines larger than 16-in., Crane 150-Pound Cast Steel Gate Valves are recommended.  
(For sizes under 2-in., use Crane Clamp Gate Valves.)

It's easy to simplify and speed deferred replacement work... when you take advantage of Crane *complete* piping materials service. All your piping needs are supplied by a single source—your Crane Branch or Wholesaler. You get exactly what you need—you choose from the world's greatest line of piping materials, in brass, iron and steel. Uniform quality in all parts—and one responsibility for them—helps you get the best installations. Crane Co.'s 90 years' experience in meeting piping needs assures your complete satisfaction. In Standard Iron Body Wedge Gate Valves, for example, Crane offers the complete line listed below.



CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • Branches and Wholesalers Serving All Industrial Areas

# CRANE



VALVES • FITTINGS • PIPE  
PLUMBING • HEATING • PUMPS



# THE "PIT" CHAMPION

## can take it

**Y**EARS of standout service prove Goodyear's Hard Rock Lug the best tire for heavy hauling over rocky, tire-killing ground in mine and quarry pit work.

It takes tough pounding longer because it's armored with extra-heavy undertread—and with massive lugs that extend well over the shoulders and *tread-armor* the sidewalls against cuts and gouges.

Always toughest of all, this rugged bruise resister—built from materials available today, including the mandatory amount of synthetic rubber—is now tougher than ever because its Rayotwist body—made from Goodyear's patented rayon cord—is *the strongest body we've ever used in a work tire!*

Add another plus—that self-cleaning, universal two-way tread with no rights nor lefts, same powerful grip reverse or forward—and you have all the reasons why more and more haulers make Goodyear Hard Rock Lugs first choice to move heavy loads in really rough going.

Rayotwist—T. M. The Goodyear T. & R. Co.

Goodyear Hard Rock Lug tires on Euclids—hauling coal in strip-mining operation



### HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE



1. Massive lug-bar tread
2. Extra-thick undertread
3. Tread-armored sidewalls
4. Superstrong Rayotwist cord carcass

THE GREATEST NAME IN RUBBER

# GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

COAL AGE • May, 1945





# 3-WAY ENGINEERING POINTED THE WAY TO 48-OZ. DUCK CONVEYOR BELTS

**FOR COAL  
FOR ROCK  
FOR ORE**

Many successful conveyor systems using 48-oz. duck belting developed by U.S. Rubber have been engineered for coal mines—both for underground and slope installations . . . also for handling rock and ore on big jobs involving long centers, high lifts, and heavy loads.

The success of these installations is due to closely coordinated planning on the part of the engineers representing mine operators, conveyor equipment manufacturers and United States Rubber Company . . . a "teamwork" policy you will find advantageous. When you plan a new conveyor system let our engineers work with you.

*Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony Program, CBS network, Sunday afternoon, 3:00 to 4:30 E.W.T.*

**UNITED STATES RUBBER COMPANY**

1230 Sixth Avenue, Rockefeller Center, New York 20, N. Y. In Canada: Dominion Rubber Co., Ltd.

SERVING



THROUGH SCIENCE





**TEXACO LUBRICANTS FOR**



# PROTECTING PRODUCTION

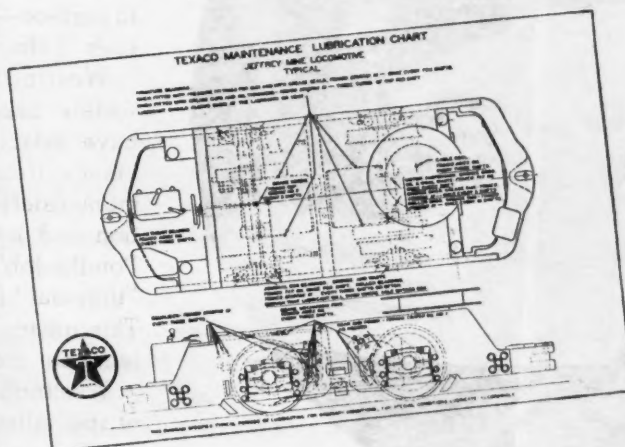
**B**ECAUSE of the huge demands of war, giant stripping shovels like this must constantly produce at as near 100% capacity as possible. Smoothly functioning wire rope is a major factor in achieving this.

To obtain the best service from wire rope on all types of equipment, it must be thoroughly protected against the destructive effects of wear and weather. This can best be assured by keeping it effectively lubricated — with *Texaco*.

*Texaco Crater "A"* penetrates into and preserves the core of wire rope, preventing collapse. It seals each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion. Keeps rope strong longer.

Used on open gears, *Texaco Crater* cushions load shocks, quiets noise, reduces wear. It doesn't channel or throw off, but clings to tooth surfaces, following through from gear to gear, despite high pressures and temperatures, and peripheral speeds.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, *National Sales Division*, Dept. C, 135 East 42nd Street, New York 17, N. Y.



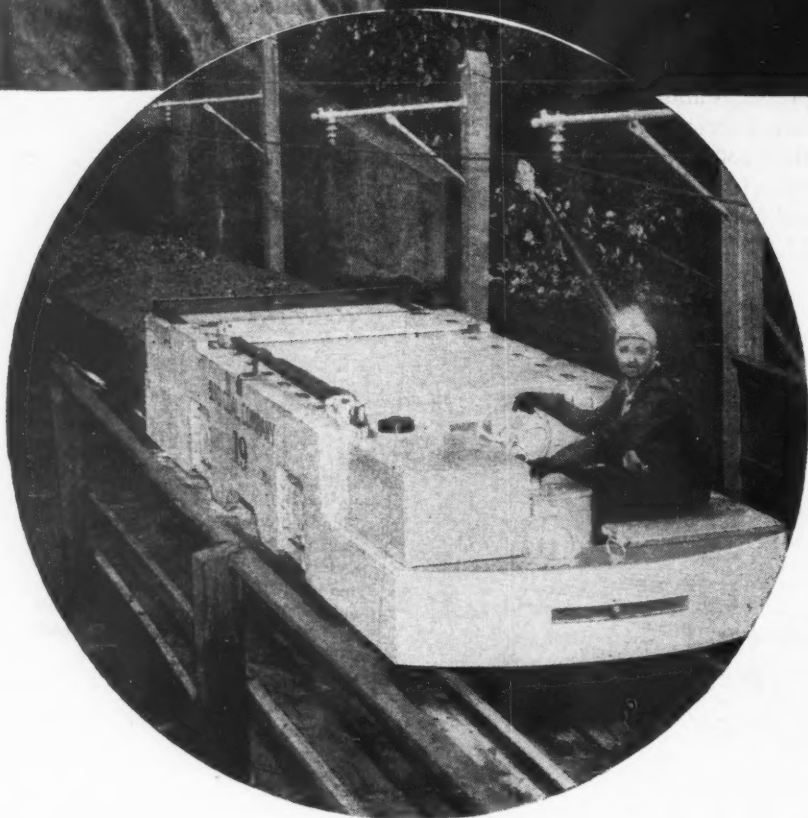
**FREE:** Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery who approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly where to use Texaco, when and with what lubricant to service each lubrication point. Order the Charts you need by make and model of each machine.

## ITS For the Coal Mining Industry

# "a lot safer to operate"



John Barron, Electrical Superintendent of the Bird Coal Company, Johnstown, Penna., says, "The Westinghouse new Flush-Frame construction provides more space for the operator and equipment. Not only that, but it's a lot safer to operate with the old type projection taken off. Inspection is a cinch and the men are glad to make their periodic check on schedule. There's no doubt in my mind Westinghouse Mine Locomotives are streamlined for operation and inspection."



**GETTING OUT THE COAL . . .** is of vital importance these days to meet the ever-increasing demand for higher tonnage. Dependable, fast, safe performance of mine locomotives—from face to surface—is more necessary now than ever before.

Westinghouse Mine Locomotives, widely used throughout the industry, have established a reputation for efficiency, trouble-free operation and maximum safety. Designed for easy operation and inspection, they deliver more "on-the-job" haulage . . . with less "time-out" for maintenance and repairs. This means lower operating and maintenance costs.

Westinghouse has had many years of specialized experience in the design, development and manufacture of mine locomotives. For complete information call your closest Westinghouse office or write Westinghouse Electric & Mfg. Co., P.O. Box 868, Pittsburgh 30, Pa.



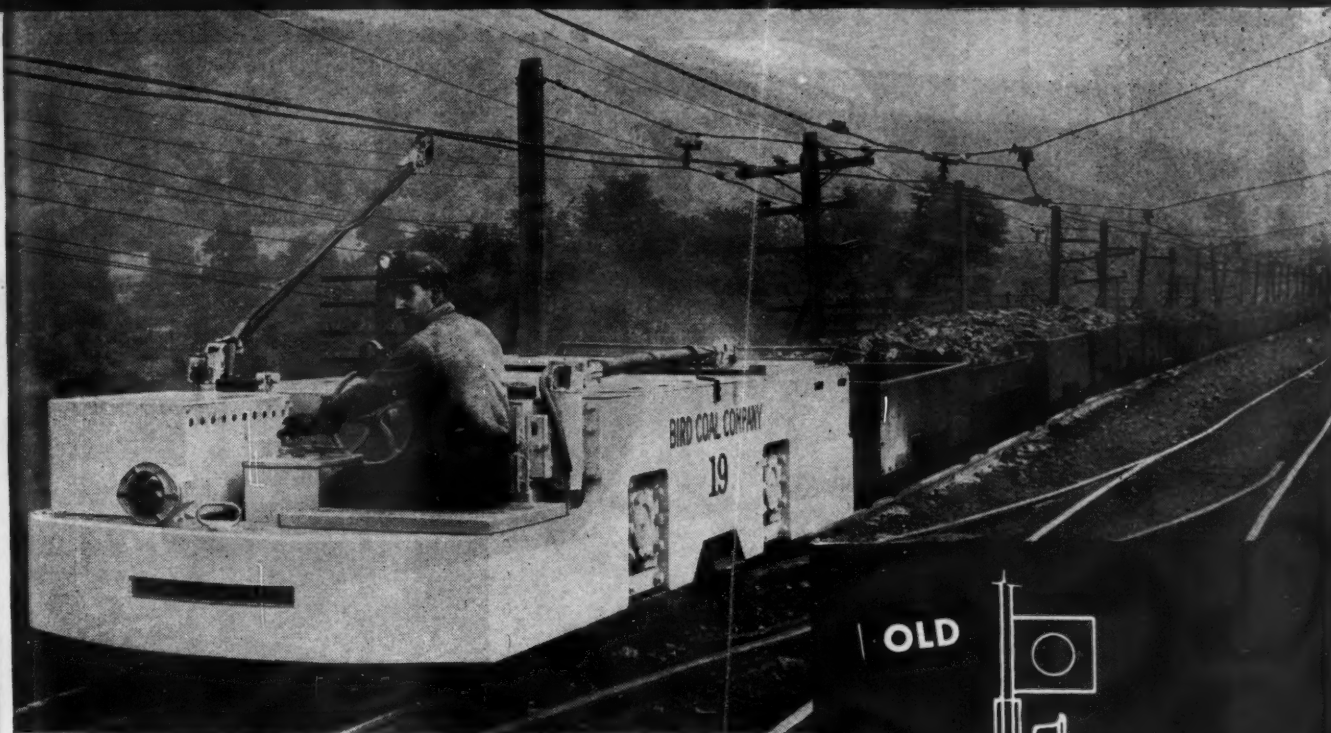
## Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

## MINE



*and inspection is a cinch!"*

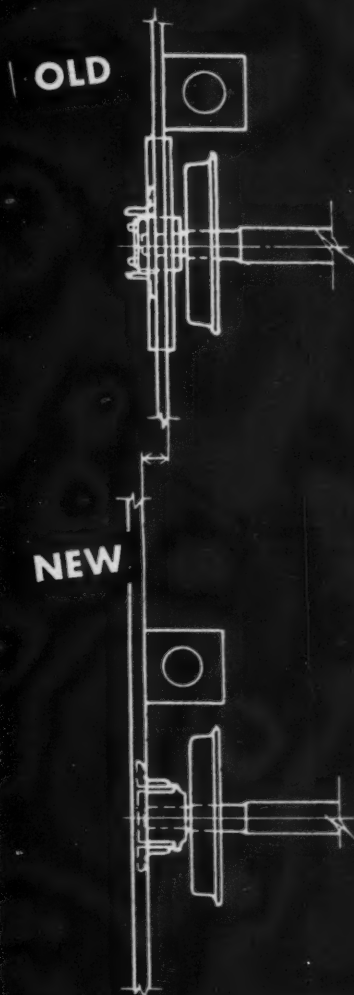


#### **AT WORK...FOR BIRD COAL COMPANY**

Westinghouse Mine Locomotives, as illustrated here and on opposite page, are doing a real haulage job for the Bird Coal Company. Because of their practical design, exclusive features and rugged construction, they can be depended upon for years of satisfactory service.

#### **EXTRA SPACE IN NEW FLUSH-TYPE FRAME... KEY TO MANY ADVANTAGES**

The flush-frame construction of Westinghouse Mine Locomotives provides extra space without increasing the over-all width. In addition to better appearance, the additional space permits a better equipment layout, mechanically and electrically... with improved arrangement of cable ducts, more space for removing springs, larger sand boxes and many other advantages. Inspection and maintenance are easier and there is more room for the operator. Old-type projection of journal box beyond the side frames is eliminated, thus reducing the possibility of serious accidents to mining personnel and equipment. J-15100



# **E LOCOMOTIVES**





# Goodman

UN  
CAPAC

Goodman belts are made of light, sturdy sections easily handled and assembled. A tandem drive reduces belt tension and wear. There is an adjustable head pulley for aid in training the belt and a self-cleaning tail pulley for keeping the return belt clean. All Goodman belts are reversible. Where desired, there are belts with adjustable speed motors and controls; low speed for moving men to working areas, higher speeds for delivery of coal.



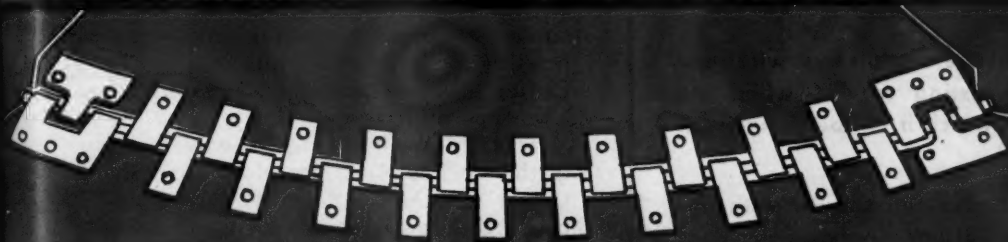
# Goodman

MANUFACTURING CO.



# UNDERGROUND BELT CONVEYORS

CAPACITIES UP TO 500 TONS PER HOUR — — LENGTHS UP TO 3,000 FEET



## GOODMAN FLEXIBLE HINGED BELT CONNECTOR

An exclusive Goodman design that permits quick connection of belt ends at new installations, when inserting repair lengths, or when extending the belt. A wire rope hinge pin locks the looped strape fastened to the belt ends. The flexibility of the pin shapes the connector to the contour of the belt, permits it to flow smoothly around small diameter pulleys.



COMPANY • Halsted Street at 48th • Chicago 9, Illinois

# From Surface to Working Face...

## ROPE REMINDERS

When you look at wire rope performance records it sometimes pays to remember that wire rope is part of a team.

The point is that the world's best wire rope can't give you lasting service when the machinery over which it is operating is off the beam.

Wire rope can't give full service with improper sheaves—drums—reeving . . . poor general operating conditions.

The answer is regular inspection not only of the rope but of everything that pertains to its efficient operation.

And if abnormal wear seems to be evidenced, call in a Roebling engineer. He makes tests and recommendations that will save you future rope worries and excessive costs.

WITH MARKETS EXPANDING . . . manpower shrinking . . . mines must boost production *efficiently*. And rigging your equipment with Roebling "Blue Center" Wire Rope is a long-step in that direction. From surface stripping to deep mining—on all hoisting, pulling and loading jobs—"Blue Center" delivers dependable service . . . at lower operating cost.

After all, the basis of good wire rope is in the steel in the wires. Roebling "Blue Center" Steel—the finest wire rope steel produced—is custom-made in our *small* open-hearth furnaces, where quality is closely controlled. Add 104 years of experience in rope-making . . . unsurpassed facilities for research—testing—manufacturing . . . and *you* get the utmost in wire rope value.

Roebling engineers are at your service . . . to help you select the right rope . . . get maximum service from it. Check our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities

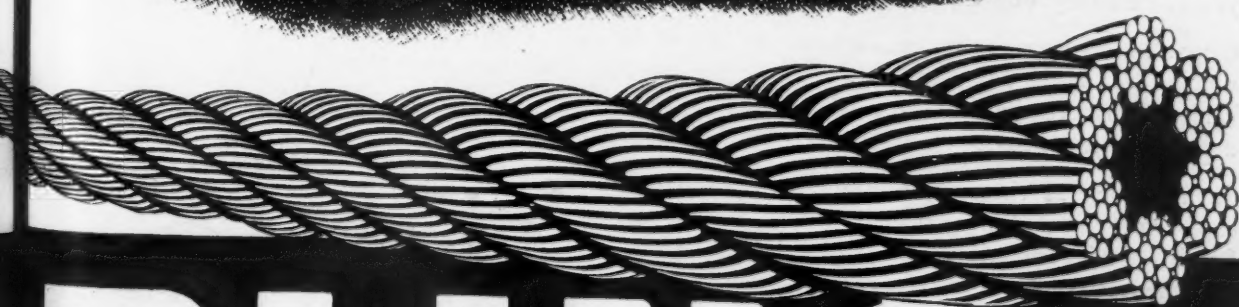
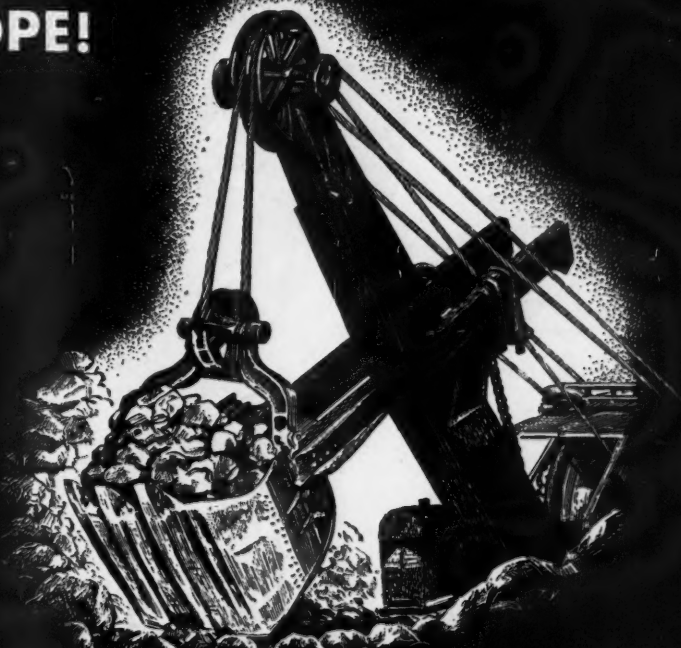


# ROEBLING

## P A C E M A K E R I N W



IT'S A JOB FOR  
ROEBLING  
WIRE ROPE!



# BLING



W I R E P R O D U C T S

COAL AGE • May, 1945

# "Penny-Wise and Pound-Foolish" is bad practise in blasting, too!

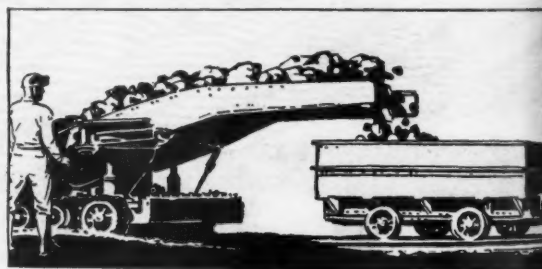


When it comes to blasting, today's operators know that it's false economy to be thrifty in small matters and wasteful in big ones. They realize that the cost of explosives is small when measured in terms of the final cost of loading coal. They know that true saving is a matter of selection and application—that you can't wisely buy explosives on price alone.

Over-all blasting economy comes from the use of the right explosive in the right place, in the right amount. It takes into account such factors as the loader, transportation and the crusher. It cuts down delays and idle hours.

Savings such as these often begin with an Atlas explosive—an explosive selected from the Atlas family of 25 permissible grades. Call in the Atlas Representative. He can often help produce real operating economies.

Good Blasting Makes Money—Poor Blasting Loses Money ▶



# ATLAS

EXPLOSIVES  
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



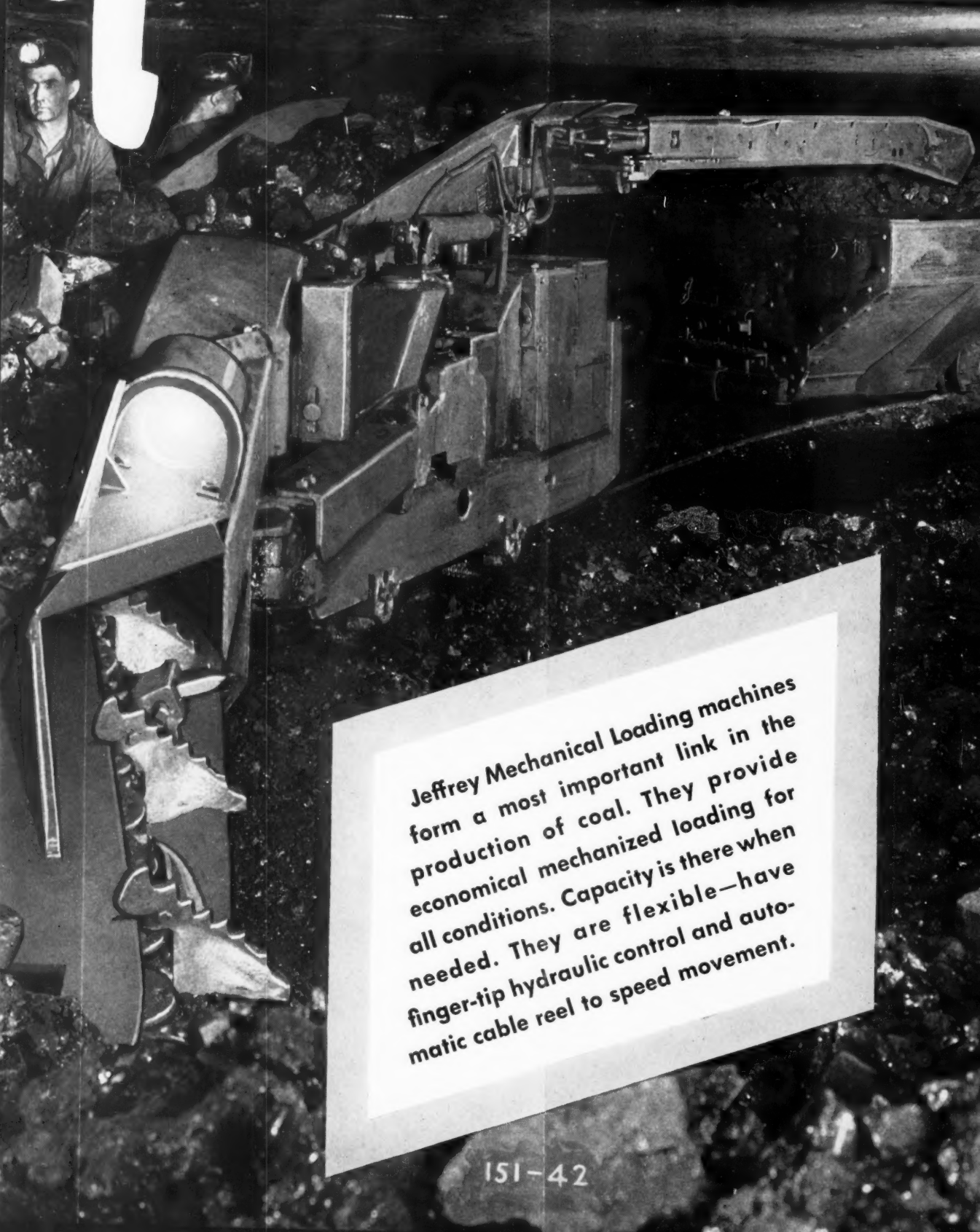
# Johnny

LO





# 4 LOADERS



Jeffrey Mechanical Loading machines form a most important link in the production of coal. They provide economical mechanized loading for all conditions. Capacity is there when needed. They are flexible—have finger-tip hydraulic control and automatic cable reel to speed movement.







# COAL

*supports rail transportation  
to the extent of*

## 135 MILLION TONS

*Annually*



The railroads require this huge tonnage to keep vital war materials moving to the front—to serve industry—to move troops and civilians on important missions.

Jeffrey mining machinery—loaders, drills, cutters, underground conveyors, locomotives, sizing and cleaning equipment—has a definite place in the production of coal for railroad consumption. Our engineers realize that considerable responsibility falls upon these units—they build accordingly.

**BUY  
WAR  
BONDS**

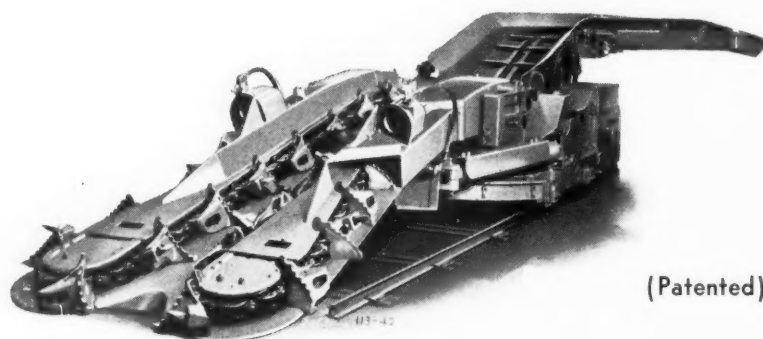
# Jeffrey

# LOADERS

**JEFFREY SERVICE  
TO THE COAL MINES  
MEANS SERVICE  
TO ALL INDUSTRY**

**JEFFREY EQUIPMENT  
FOR COAL MINES**

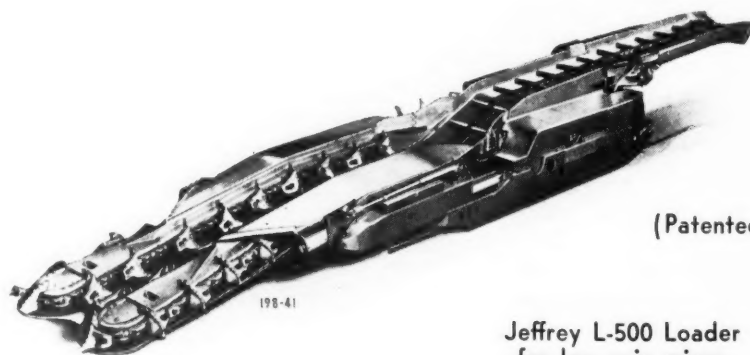
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



(Patented)

Jeffrey L-600 Loader for mines with unrestricted height

These machines offer high capacity loading to all mines with seams ranging from three and one-half feet upward. Ideally suited to room and pillar mining in panels, block system or in other methods of pillar recovery. Chief difference is in overall height.



(Patented)

Jeffrey L-500 Loader  
for low vein mines

## THE JEFFREY MANUFACTURING COMPANY

*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

**Sales Offices:**

Baltimore  
Birmingham  
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St. Louis  
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Harlan, Ky.

Birmingham  
St. Louis

Logan-Beckley  
W. Va.

Scranton

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Jeffrey Mfg. Co., Ltd.  
Montreal, Quebec

British Jeffrey-Diamond, Ltd.  
Wakefield, England

Jeffrey-Galion (Pty), Ltd.  
Johannesburg, S. A.







# TRACTOR POWER IS "**MUST**" POWER

Above: Fast-working, powerful Allis-Chalmers Diesel speeds stripping for Red Warrior Coal & Mining Corp., Brazil, Indiana. Below: Same Diesel handles emergency road repair job.

Tractors are "must" equipment for modern miners. Wherever used they increase profits, make mining easier, faster. Working with bulldozers, they dig and push material, heave trees, stumps, rocks aside — your cheapest possible handling method. Where earth has to be moved over a distance, they work with scrapers . . . dig and load quickly, travel over roughest going taking steep grades in stride, dump exactly where wanted. Important, too, is the ability of tractors to move and spot heavy machinery.

If you haven't as yet investigated the possibilities of tractor power . . . it will pay you to do so now. Let your Allis-Chalmers dealer prove how it will lower your cost of operation, speed up production and increase your profits.



**ALLIS-CHALMERS**  
TRACTOR DIVISION—MILWAUKEE 1, U. S. A.

# Announcing A NEW PORTABLE



## Underground A-C Power WHERE you want it... WHEN you want it

The low height (42 in.) and ready mobility of the new G-E portable a-c unit substation make it an important addition to G.E.'s line of portable substations. Here are some of the important design features of the new unit:

- 1 All-welded, steel transformer tank is completely sealed and pressure-tested before leaving the factory. The all-metal enclosure is safely grounded, and easy to keep clean. There are no dust-collecting air ducts.
- 2 Primary junction box includes solderless connectors. Where desired, three gang-operated, oil-filled cutouts can be supplied (for circuits below 5000 volts).
- 3 Removable plate gives ready access to handle of ratio adjuster, for easy and safe changing of taps when the transformer is "dead."
- 4 Cable stuffing boxes permit cables to be clamped in place, and prevent dust and water from entering air-circuit-breaker compartment.
- 5 Outdoor-type dustproof and weatherproof air-circuit-breaker compartment provides ample protection for both underground and outdoor service.
- 6 Air circuit breakers for low-voltage feeders. They are rated for 15,000-amp interrupting capacity and include thermal time trip and instantaneous high-current trip.
- 7 Low-voltage receptacles and plugs can be supplied for circuits of 200 amp and less when specified.
- 8 Transformer section is filled with Pyranol\*—General Electric's nonsludging cooling and insulating liquid that will not burn.
- 9 Skid-type base, with protective bumper. The substation can be mounted on wheels to fit any track gauge used in mines. \*Trade-mark Reg. U.S. Pat. Off.



# UNIT SUBSTATION

TO KEEP A-C MOTOR SPEEDS  
UP AND COPPER COST DOWN

**N**OW IT IS EASIER than ever before to run your high-voltage a-c feeders right up close to the working face. It is easier to cut down the length of your heavy, costly low-voltage secondaries. It is easier to eliminate the voltage drop which slows down machines and production.

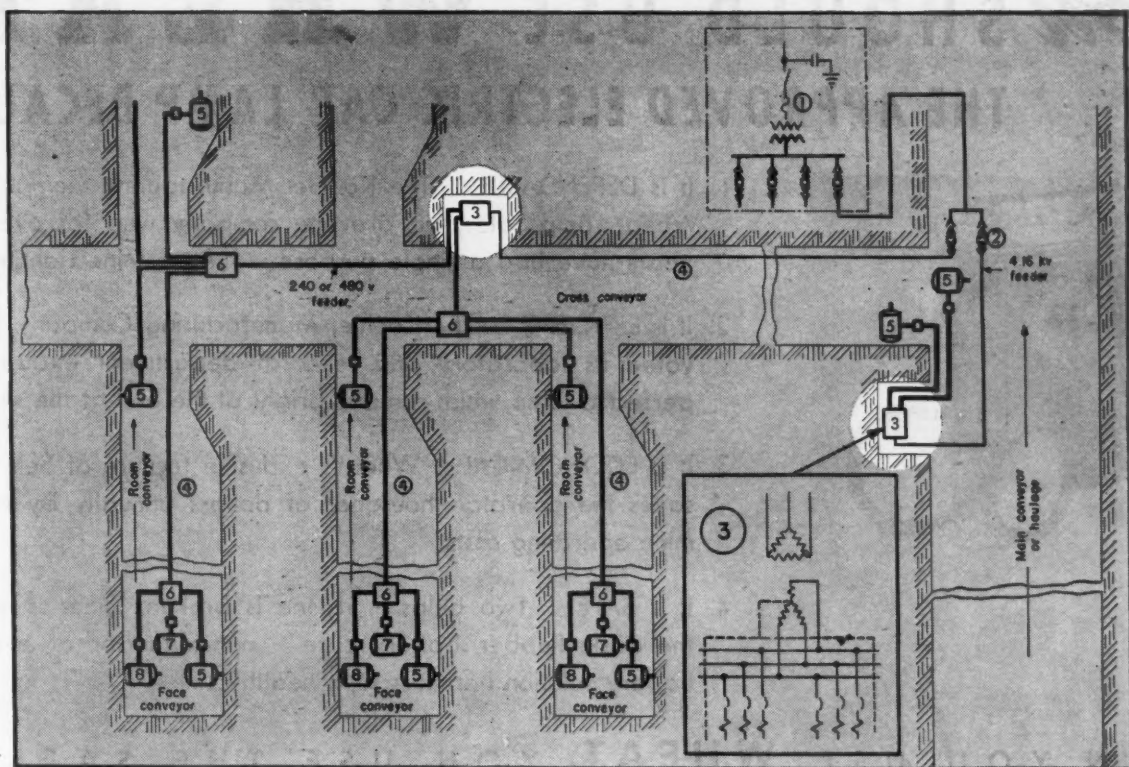
This new, *complete* G-E unit substation was specially designed for modern a-c mine service—to make it a simple, practical matter to keep moving your transformer in as new rooms are developed. It is surprisingly compact (only 42 inches high!). It is readily portable.

The new G-E unit is designed around Pyranol transformer sections for maximum safety. It is completely

metal enclosed, mounted on skids (or wheels if required), and includes all the necessary components for handling 2400- to 7200-volt incoming lines and outgoing low-voltage feeders of 600 volts or less. All electrical and mechanical components are *fully co-ordinated* by one manufacturer, assuring you of long, dependable service.

The typical plan below shows how this new unit substation can be used to supply power to conveyors, fans, drills, pumps, loading machines, cutters, and other a-c mining machinery. For adaptation to your electrical layout, you'll want detailed information on sizes, weights and dimensions, and technical data on equipment and ratings. Write today for Bulletin GEA-4301.

*General Electric Company, Schenectady 5, N. Y.*



Typical a-c mine distribution system, showing how the new G-E low-height, portable, mine-type, a-c unit substation can bring high-voltage primary power closer to the working face. (1) Master unit substation at entrance to mine (2) Sectionalizing circuit breakers (3) New G-E PORTABLE A-C UNIT SUBSTATION (4) Mine-type cable (5) Conveyor drives (6) Low-voltage distribution box (7) Loader drive (8) Cutter drive

Buy all the BONDS you can—and keep all you buy

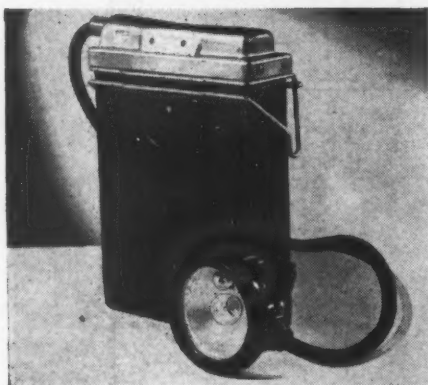
**GENERAL  ELECTRIC**

657-41-294

# Tim Malloy says...



## *You* SHOULD USE **WHEAT**— THE APPROVED ELECTRIC CAP LAMP BECAUSE:



1. It is **DEPENDABLE** — The Koehler Manufacturing Company and Wheat Lamp Sales, Inc. are one company who for over thirty years have had a single purpose — Better Mine Lighting.
2. It is **EFFICIENT** — The Koehler Manufacturing Company has devoted its laboratory and research department exclusively to perfect a lamp which remains bright at the end of the shift.
3. It is **ECONOMICAL** — Wheat's exclusive feature of Self Service saves the operator thousands of dollars annually by reducing mine operating costs.
4. It is **SAFE** — Two bulbs — if one is broken, miner is never in the dark. Rubber battery case — non-conductor of electricity. Battery solution harmless to a healthy skin.

WHEN YOU USE WHEAT YOU USE THE SAFEST!

*Write today—*  
**WHEAT LAMP  
SALES, INC.**

1501 Kanawha Valley Bldg.  
Charleston, W. Va.

**MANUFACTURED BY  
KOEHLER MFG. CO.**  
MARLBORO, MASS.  
**SPECIALISTS IN MINE  
LIGHTING FOR 30 YEARS**



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# GAR WOOD EQUIPMENT FIGHTING ON EVERY FRONT



Material handling  
Crane.  
Signal Corps Photo



Cable Bulldozer.

Hi-Lift Cargo Plane  
Loader.  
© International News  
Photo Service

Giant Truck Body  
with automatic  
downfold tailgate.  
Telescopic  
Hydraulic Hoist.

Somewhere off in the far Pacific... on the hard fought battlefields of Europe... In Asia... Africa... anywhere, you name it... that's where Gar Wood equipment is serving Allied Forces in a hundred different ways. Famed Bulldozers with a colorful history, earth-moving Scrapers, tireless Winches, Wrecker Cranes, Hi-Lift Plane Loaders, Hydraulic Hoists, Dump Bodies, gasoline, oil and water Truck Tanks... these and many others are the wartime products of Gar Wood. Each of the six divisions of Gar Wood Industries, Inc. specializes in its field, and each division is busy producing the fighting equipment it knows best how to build.

When Victory has been won, Gar Wood Equipment will again be available for civilian use. All the experience accumulated in years of peacetime will be combined with new wartime developments to bring you better-than-ever Gar Wood Equipment.

Support the 7th War Loan Drive  
BUY MORE BONDS



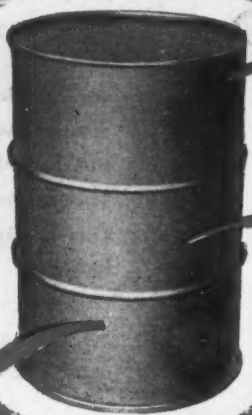
## GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH.

WORLD'S LARGEST MANUFACTURER OF TRUCK AND TRAILER EQUIPMENT

HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

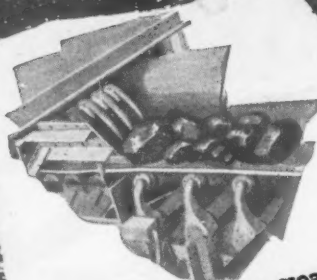
# GREASES..ENGINEERED TO



## 9 YEARS... WITHOUT A BEARING FAILURE

That is the report of a mine operator running a 730 foot conveyor belt from cleaning house to boom house... most of it outdoors in all weather.

Yet, for nine years, two shifts a day, the conveyor's anti-friction bearings have never failed. The operator attributes this trouble-free performance to Tycol Green Cast Greases that "take-it" and provide the "film of protection" under heat and cold alike.

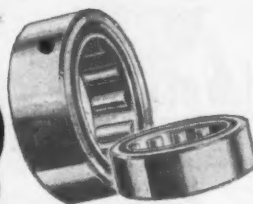


## NO STARVED BEARINGS ON OUR 400 MINE CARS



Low winter temperature drag was eliminated and no starved bearings during high summer operating temperatures—resulting in less power consumption and reduced maintenance costs. Now thanks to Tycol Green Cast Greases there is no worry over changes in atmospheric temperatures—in or out of the mine. Thus drag, loss of power and excessive use of lubricant has been eliminated.

## COSTLY WEAR OF ROLLER BEARINGS STOPPED



"Tycol Green Cast Grease never leaves a soap or foreign deposit in the bearings," stated one operator. Gone is the worry over delays and costs caused by separation and breakdown of grease formerly used. Tycol grease resists breakdown in structure, thus assuring maximum lubrication.

DRUMS! DRUMS! DRUMS!

War needs make it extremely important that all empty drums be returned promptly.



## TIDE WATER

TIDE WATER OIL COMPANY OF CANADA, LTD.

Toronto • Montreal

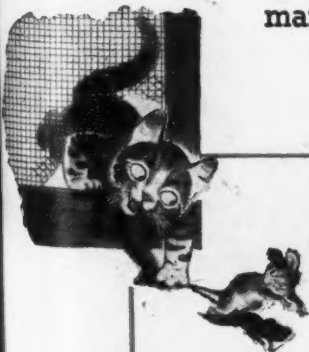
# "TAKE-IT"

## ON THE TOUGHEST JOBS!

Peak production . . . without worry of breakdown due to friction and wear . . . is made easier with Tycol Green Cast Greases.

Engineered to "take-it," without thinning down and dripping, Tycol Green Cast Greases avoid wasted lubricant, lost bearings and unnecessary "time out". These modern lubricants keep bearings . . . pistons . . . gears friction-free and cool. They supply the "film of protection" needed to give power a chance to produce with a minimum of waste.

Call your nearest Tide Water Associated office. Let them suggest the Tycol Green Cast Grease engineered to "take-it" on your specific problem . . . and remember, Tycol greases are made from high quality cylinder stock and well refined neutral oil, with a minimum of soap—a maximum of oil . . . more efficient lubrication per pound of grease.



### PENETRATION

This informative handbook gives clear, concise descriptions of the basic tests used to determine important lubrication properties—Penetration, Viscosity, Pour Point

### WHAT IT MEANS IN GREASE — SEE TIDE WATER "LUBRICANIA"

and many others. For your FREE copy, write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

## ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

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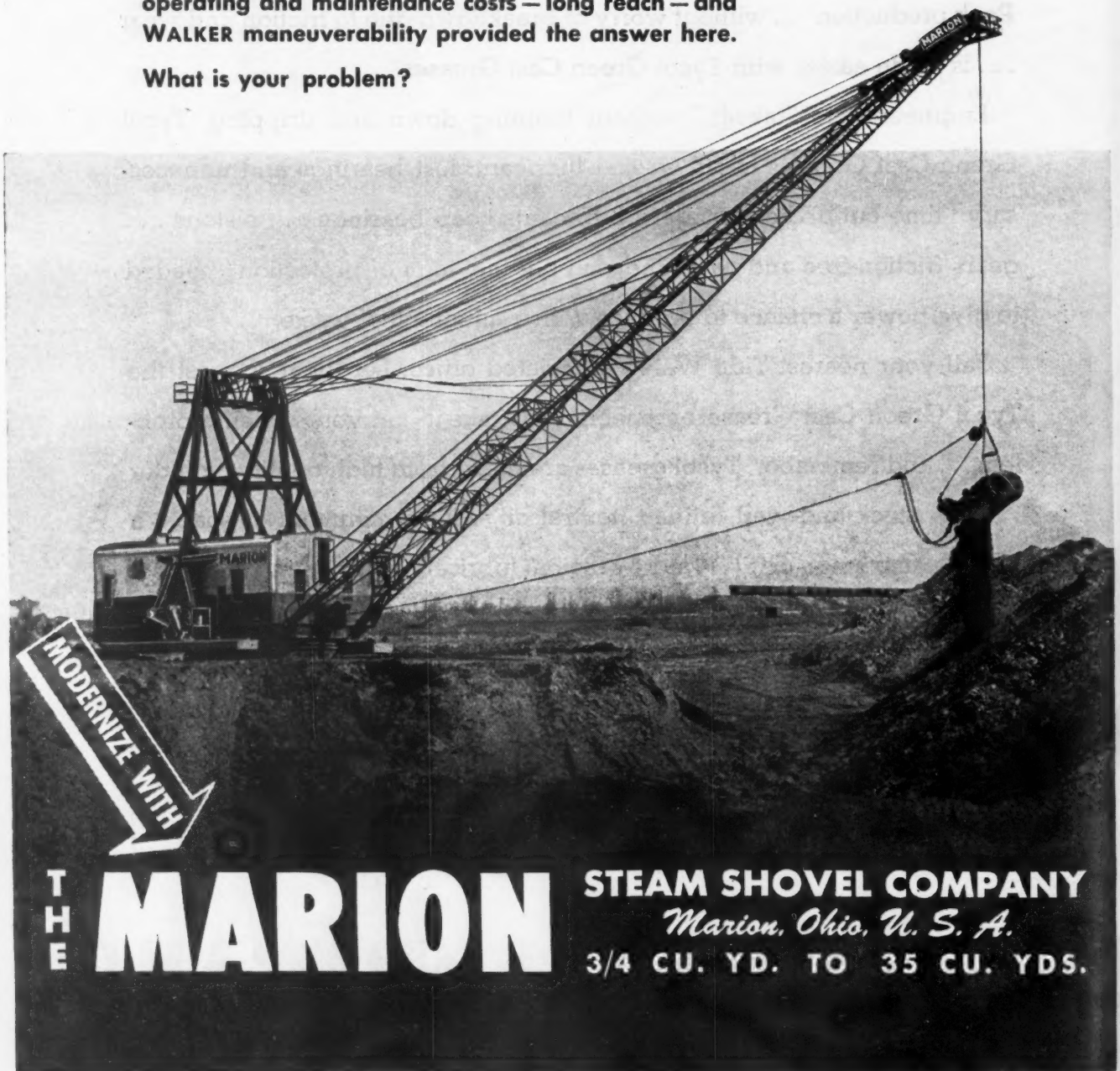
Boston • Philadelphia • Pittsburgh • Charlotte, N. C.



# A RATIO OF 33 TO 1 OVERBURDEN SOLVED WITH **MARION WALKERS**

To mine profitably a 20" seam of coal under 55 feet of rock and shale overburden, The Clemens Coal Company of Pittsburg, Kansas, uses MARION WALKERS. Low operating and maintenance costs — long reach — and WALKER maneuverability provided the answer here.

What is your problem?



**MODERNIZE WITH**

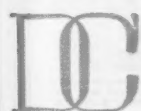
**THE MARION**

**STEAM SHOVEL COMPANY**  
*Marion, Ohio, U. S. A.*  
3/4 CU. YD. TO 35 CU. YDS.



**DOW CORNING, first in silicones,  
is fully equipped with new plant and facilities for  
the production and distribution of an expanding line of silicone products**

American industry has been quick to utilize the new Dow Corning Silicones—to see the potentialities inherent in their higher order of heat stability, chemical inertness, water resistance, and dielectric properties. Dow Corning is now supplying, directly or through selected distributors, the following silicone products:



#### **FLUIDS**

Water-white, odorless, inert Silicone Liquids . . . notable for their low rate of viscosity change over a wide temperature range, low vapor pressure, water repellency, and good dielectric properties.



#### **993**

Insulating Varnish . . . recommended because of its extreme heat stability for impregnating, coating and bonding, and waterproofing inorganic insulating materials such as asbestos, mica, and Fiberglas cloth, tape, and sleeving. Other special purpose silicone resins and compounds are available.



#### **4**

Ignition Sealing Compound . . . an easily applied silicone waterproofing compound having excellent dielectric properties, corona resistance, and the consistency of petroleum jelly. It neither hardens nor melts at temperatures ranging from  $-40^{\circ}\text{F.}$  to  $400^{\circ}\text{F.}$



#### **STOPCOCK GREASE**

A chemically resistant Silicone Grease for lubricating stopcocks and other ground glass joints.



#### **7**

Special Low Temperature Compound . . . an oxidation resistant lubricant and sealing compound developed for use at temperatures as low as  $-70^{\circ}\text{F.}$



#### **PLUG COCK GREASE**

A Silicone Grease that affords easy operation of lubricated plug valves over wide temperature ranges in most difficult services.



#### **31**

A lubricating Silicone Grease for special applications in the temperature range of  $-70^{\circ}\text{F.}$  to  $190^{\circ}\text{F.}$



#### **41**

A lubricating Silicone Grease for special applications where operating temperatures range from  $0^{\circ}\text{F.}$  to  $400^{\circ}\text{F.}$



**DOW CORNING CORPORATION  
MIDLAND, MICHIGAN**  
ADDRESS ALL INQUIRIES TO BOX 592







# It was easy to pick the right grease then...



When greasing a wagon or mill wheel was the only lubrication problem, and the principal choice of lubricant lay between bacon rind and axle grease, everyone was his own lubrication specialist. The oak or maple bearings on the old mill wheels could be replaced every winter, if needed. If the grease on wagon wheels became too stiff in cold weather, the horses pulled harder. But horsepower today is more temperamental.

Many factors now enter into the selection of grease: such as types of bearings, bearing clearances, pressures or loads, temperatures, speeds, and the many possible combinations of these. To meet these conditions, there are numerous types and grades of grease, with various oil viscosities, penetration characteristics, and temperature- and water-resistant qualities.

Fitting these many types of grease to the countless jobs requiring grease lubrication in industry is a specialist's work. Standard Oil has such specialists. The Lubrication Engineer in your locality will help you with this problem. He has a wide range of products from which to choose. He's had years of practical experience in applying them.

Why not put your grease lubrication in the hands of the Standard Oil Lubrication Engineer near you? Let him help you start saving horsepower and maintenance now for the coming competitive post-war period.

*Buy more War Bonds*



Cup Grease. Lime soap base, low viscosity oil.



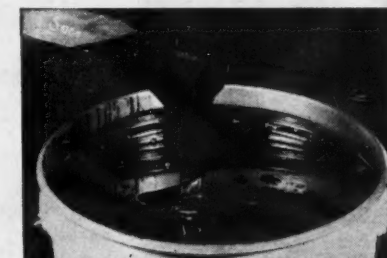
Cup or Pressure Gun Grease. Lime soap base, medium or medium heavy viscosity oil.



Fibre Grease. Soda soap base, medium viscosity oil.



Short-fibre Grease. Soda soap base, medium viscosity oil.



Compound. Usually no soap base, special petroleum stocks.

## STANDARD OIL COMPANY (INDIANA)

STANDARD  
SERVICE

★ LUBRICATION ENGINEERING

# ENDURANCE



Here the relative time-resistances of various braids, of saturants and of insulations are tested against the destructive influence of ultra-violet light, high temperatures, and simulated wind and rain.



# IN COVERINGS

For every braid or wrapping:—  
constant Research-testing for  
all possible securities of service.

General Cable's research program recognizes no *minor* problems of conductors, insulations, or of coverings. The abrasion hazards in the winding of motor armatures, the longevity of pole line installations, the cutting down of friction in pulling-in building wires—all of these and a host of other problems are subjected to searching scrutiny. For the testing of the textile yarns as raw materials, at various stages of manufacture and in the finished product, specialized practice is employed, using the most sensitive equipment that engineering brains can devise.

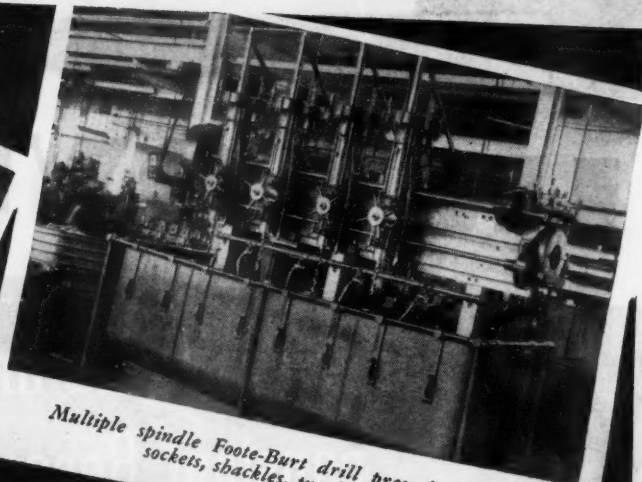
## GENERAL CABLE CORPORATION



*Manufacturers of Bare and Insulated Wires and Cables  
for Every Electrical Purpose*



*Landis bolt cutter—the very latest model; cuts threads on U-W turnbuckles.*



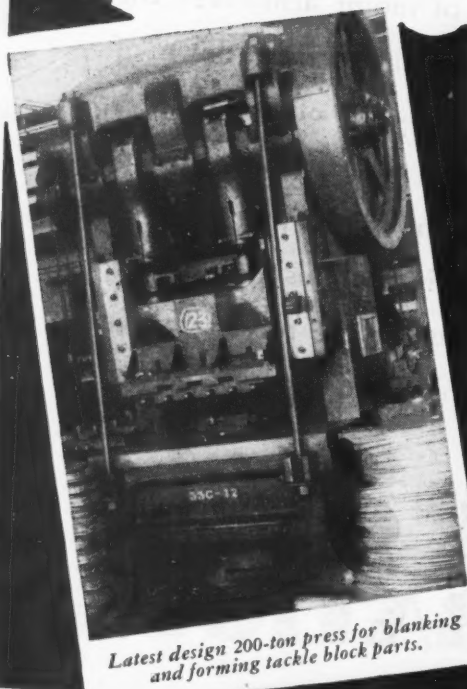
*Multiple spindle Foote-Burt drill press for drilling sockets, shackles, turnbuckles.*

**THE NEWEST,  
FINEST EQUIPMENT...**

*Another reason Upson-Walton  
Products are Better Products*

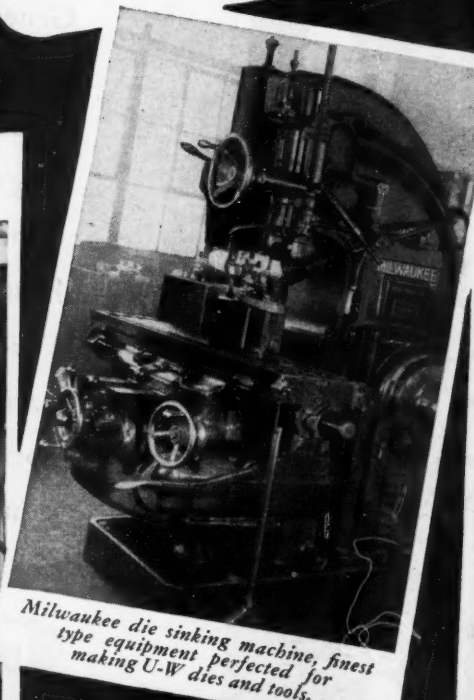
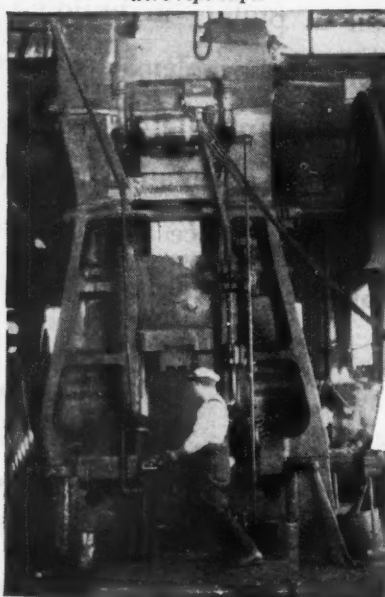
*Illustrated are just a few of the  
machines—all of them the very finest  
and newest of their kind—used for  
making these U-W products:*

**TACKLE BLOCKS • SOCKETS • EYE BOLTS  
TURNBUCKLES • THIMBLES • SWIVELS  
SHACKLES • HOOKS • WIRE ROPE CLIPS**



*Latest design 200-ton press for blanking and forming tackle block parts.*

*4000-pound Chambersburg drop hammer—most up-to-date model—for forging hooks, turnbuckles, sockets, shackles, wire rope clips.*



*Milwaukee die sinking machine, finest type equipment perfected for making U-W dies and tools.*

## THE UPSON-WALTON COMPANY

*Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks*

114 Broad Street  
New York 4

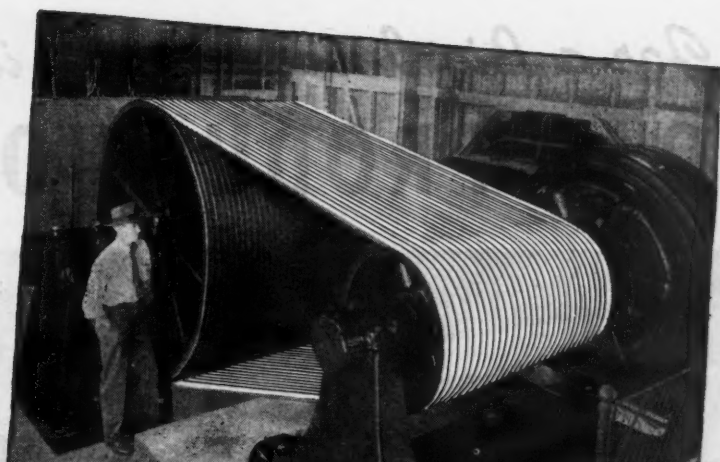
737 West Jackson Boulevard  
Chicago 6

241 Oliver Building  
Pittsburgh 22





*Here is a  
noteworthy  
fact*



# GATES *Synthetic Rubber* V-Belts

—are **TODAY** delivering **BETTER SERVICE**  
than **Pre-War** Belts of **NATURAL RUBBER!**

*—and here's  
the reason  
behind it*

Every day, on battlefields all over the world, U. S. Army tanks, tractors and self-propelled big guns are giving Gates V-belts a severity of service that no belts built before the war could possibly stand. Gates developed these combat-unit V-belts through specialized research and is building them entirely of synthetic rubber!

The importance of this fact to industrial V-belt users is this—

● Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

In many other products, as you know, war-time improvements must be withheld from general use until after the war is won. Gates V-belts are a notable exception to this rule for the simple reason that Victory depends upon production and production depends upon V-belts to drive the producing machines. That is why Gates has been able to give you immediately in your standard Gates Vulco Ropes, every V-belt improvement which Gates specialized research has developed for use on the Army's motorized equipment.

It is because of these facts that the Standard Gates Vulco Ropes you are now getting are giving you better service than any V-belts that were ever built before the war.

## THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

THE MARK OF



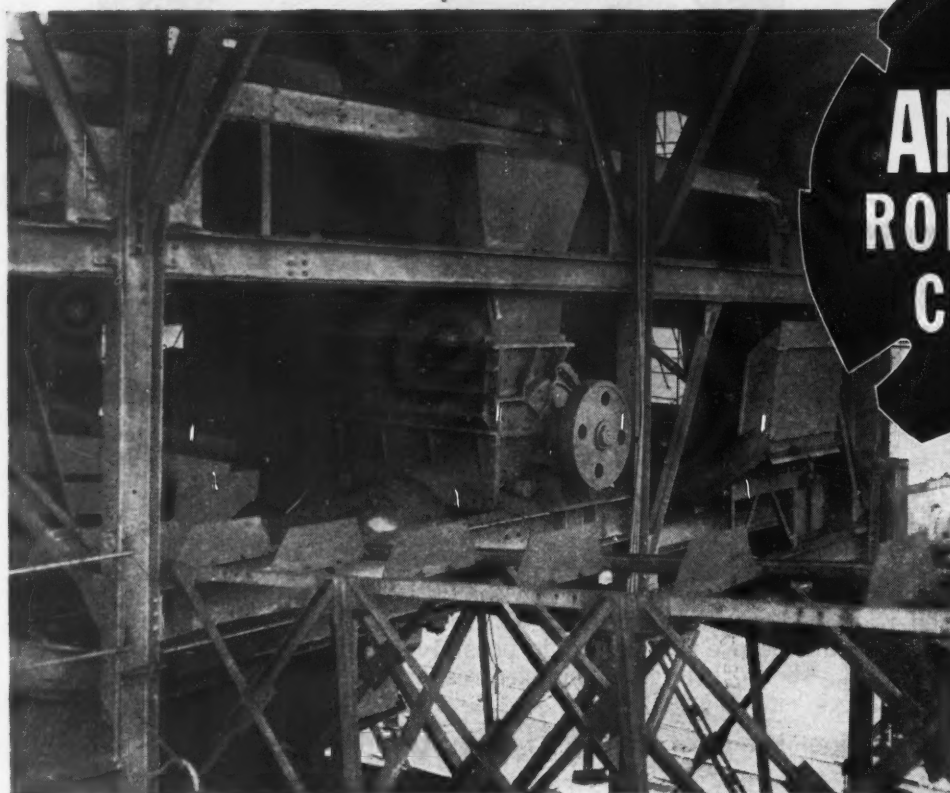
SPECIALIZED RESEARCH

455

# GATES VULCO ROPE DRIVES

CHICAGO 6, ILL. 549 West Washington. NEW YORK CITY 3, 215-219 Fourth Avenue ATLANTA 3, GA., 738 C. & S. National Bank Bldg.  
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PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL. 1090 Bryant St.

# For a Big Improvement in COAL PRODUCTION



**S**UGGESTIONS made for producing the tonnage required to meet immediate needs includes the "Maximum possible adoption and most efficient use of modern methods and equipment."

High tonnage per hour in crushing becomes a highly valuable factor in the chain of operations required in coal production. The American Rolling Ring Crusher ends the bottleneck at this operation, speeding up the production of stoker and pulverized coals in uniform sizes. While you greatly increase the crushing tonnage you get much better quality results at a truly minimum cost. This situation goes on day after day because the American Rolling Ring Crusher is built for large capacity and ability to stay on the job no matter how tough the going is. This is proved in many installations which we will gladly tell you about at your convenience.

Each unit is arranged to meet the particular requirements of each application, possible because of the flexibility of design. Our recommendations are made based on long experience.

## AMERICAN ROLLING RING CRUSHERS

**GREATER RANGE OF  
REDUCTION**

**UNIFORMITY OF SIZE**

**CRUSHING AT LESS  
THAN ONE CENT  
A TON**

**EXTREME SIMPLICITY  
OF OPERATION**

**EXTERNALLY ADJUSTED**

**EASILY ACCESSIBLE---  
COMPACT**



• The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates. These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal the rings are momentarily deflected from their course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

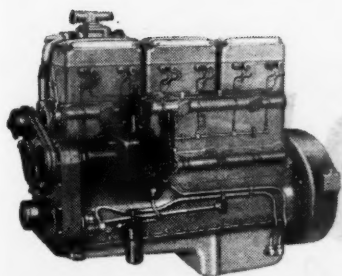


**AMERICAN PULVERIZER COMPANY**

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

1119 MACKLIND AVENUE  
ST. LOUIS, 10, MISSOURI

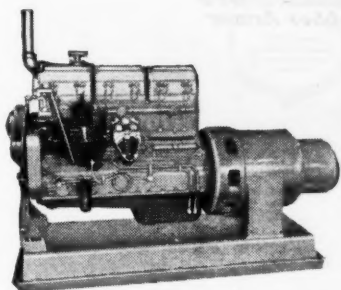




The six-cylinder, 150 hp. Model HBI-600 Cummins Diesel is a portable industrial version of the Model H engine . . . the *original* high speed diesel. It is designed for heavy-duty shovels, cranes and numerous other types of wheel and track mounted dirt moving or material handling equipment in the construction and aggregates fields.



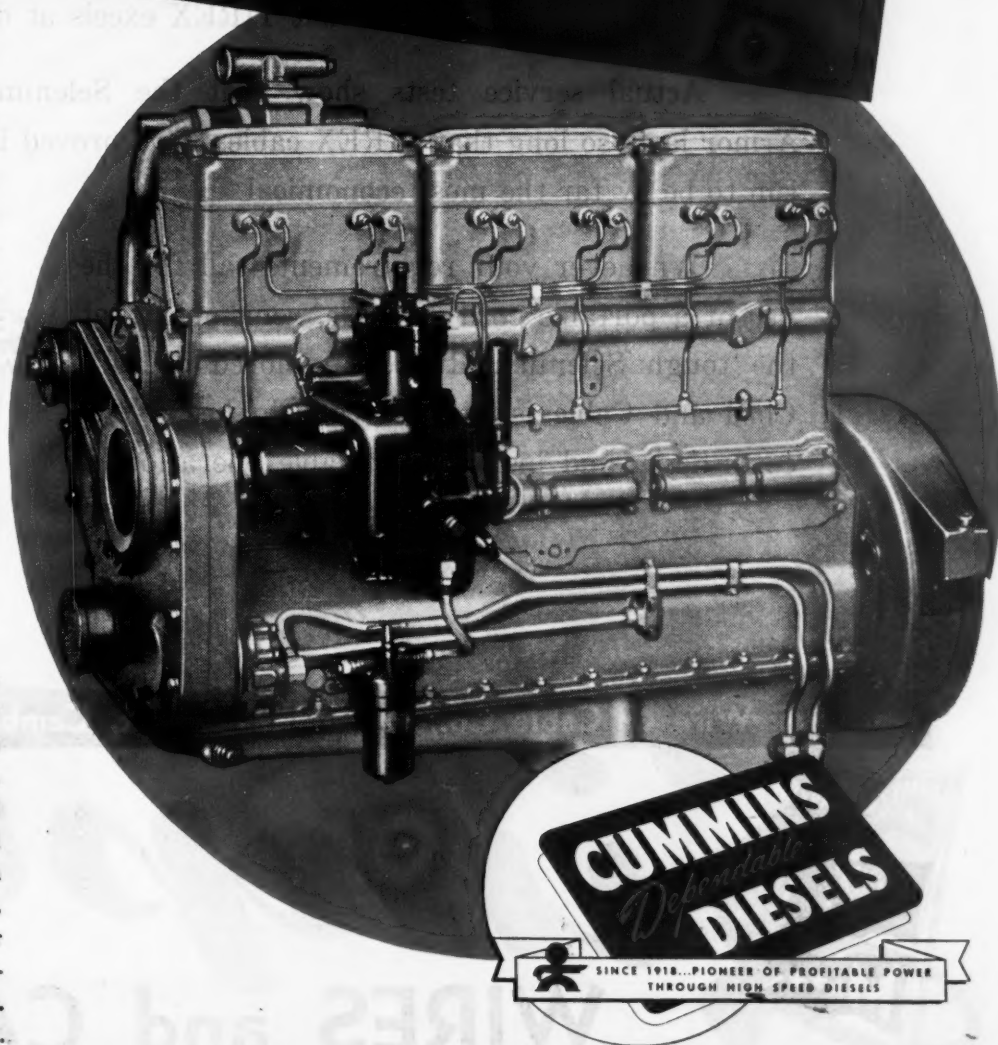
Model HP-600 Cummins Diesel is an enclosed power unit and is the same engine, basically, as the Model HBI-600, having the same horsepower rating. Like all Cummins Diesels, this model has earned acceptance among contractors and aggregates producers by its economy, quick cold-weather starting and its rugged dependability.



For generating service as well as for direct diesel drive, you can rely on Cummins Dependable Diesels for reliable, low-cost performance. Model HGA-601 (AC) and Model HGD-601 (DC) Cummins Diesel Generating Sets are offered with two ratings: 35 kw. at 900 rpm., and 50 kw. at 1200 rpm. Other models are manufactured in capacities ranging from 15 to 125 kw. Illustrated is the Model HGA-601.

For every mining operation . . . above ground or below . . . stripping, loading, hauling or generating . . . there's a Cummins Dependable Diesel whose long record of proved performance is your assurance of getting the job done—in less time—for less money.

**CUMMINS ENGINE COMPANY, INC.**  
Columbus, Indiana



**CUMMINS**  
*Dependable*  
**DIESELS**



SINCE 1918...PIONEER OF PROFITABLE POWER  
THROUGH HIGH SPEED DIESELS



# Only **TIREX** HAS THE *Selenium* **RUBBER ARMOR**

Only Simplex-TIREX has the famous Selenium Rubber Armor for its jacket. This famous jacket is well known wherever tough, hard jobs are to be done, regardless of whether it is in coal mining, ship building, in stripping operations, in rock quarries or in foundries. Selenium Rubber Armor made with synthetic rubber is becoming as famous as the prewar armor made with natural rubber. Wherever rough, abrasive conditions are found, there are the jobs that TIREX excels at doing.

Actual service tests show that the Selenium Rubber Armor lasts so long that TIREX cables have proved in the long run to be by far the most economical.

Whenever your requirements call for the use of a portable cord or cable, remember that the tough Selenium Rubber Armored TIREX Cord and Cable is the one to help keep your costs down and insure dependable operation.



**Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.**



# Simplex

## WIRES and CABLES

# WE SALUTE THE ARMY TRANSPORTATION CORPS



Close behind the fighting fronts are the unsung heroes of the army transportation corps. It is their job to keep vital war supplies rolling to the front lines and the evacuation of the wounded by means of hospital trains. It is a job of speed and efficiency and expert knowledge of the work to be done. Our chances of victory without them would be small. Night and day through bomb and strafing attacks, the supplies keep moving in endless quantities to our fighting lines—thanks to the army transportation corps. LIMA is proud of the part it has in the panorama of war time transportation at home and abroad. Hundreds of LIMA-BUILT locomotives, cranes and shovels are doing their part toward victory. At re-shipment depots and ports of debarkation and embarkation, LIMA cranes are loading and unloading ships and trains. They also coal locomotives, keep roadbeds in repair and do countless other jobs important to victory.

**LIMA LOCOMOTIVE WORKS, INCORPORATED**  
Shovel and Crane Division  
NEW YORK, N. Y.  
MEMPHIS, TENN.  
PORTLAND, OREGON  
SEATTLE, WASH.  
MONTREAL, QUEBEC, CAN.  
PHILADELPHIA, PA.  
ST. LOUIS, MO.  
MINNEAPOLIS, MINN.  
LOS ANGELES, CALIF.  
NEWARK, N. J.  
DALLAS, TEXAS  
SAN FRANCISCO, CALIF.  
SPOKANE, WASH.  
VANCOUVER, B. C.

# LIMA

**SHOVELS -- CRANES -- DRAGLINES**

**a type and size for Every Job**



# CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

**MAKES YOUR MODERN  
MECHANIZED EQUIPMENT**  
*pay bigger dividends*

## CARDOX

### HARDSOGE DRILLING EQUIPMENT

Complete line of drilling  
equipment designed to  
give you the maximum  
in drilling efficiency.

● CARDOX increases the efficiency of mechanized equipment in many ways. It makes possible the use of longer cutter-bars. It rolls out the coal for faster, easier loading... with less wear on mechanical loaders. Its gentle heaving action produces more coarse sizes... which are more eco-

nomical to clean. CARDOX-mined coal will not crumble when subjected to extensive mechanical handling. It is firm and remarkably free from shatter-cracks.

Write for full details on free demonstration of CARDOX under your current working conditions.

**CARDOX CORPORATION • Bell Building • Chicago 1, Ill.**

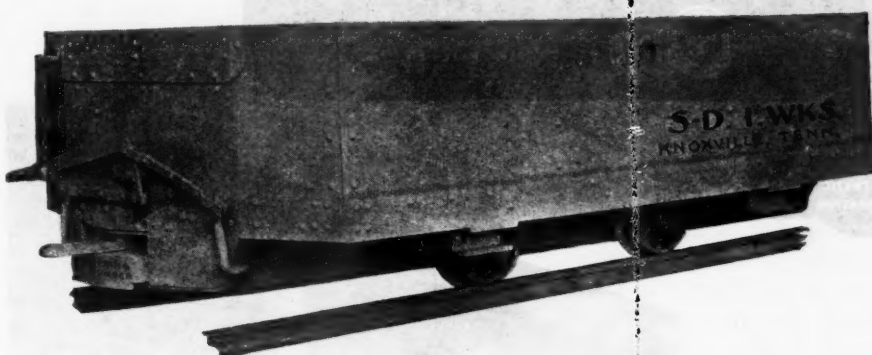
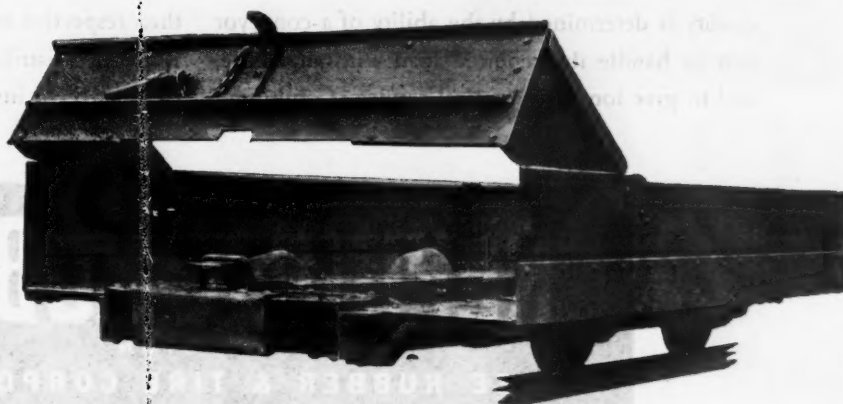
# ★ Need Replacements In End-Dump Or Rotary-Dump Cars?

Throughout the coal mining industry, for almost 40 years, Sanford-Day has been recognized for their ability to build End-Dump and Rotary-Dump cars that stand up through the years to meet the

hard service demanded of these cars. We developed the "low-floor" types of large capacity cars and our "Whopper" End-Dump and Rotary-Dump Cars will give you maximum capacity for any given overall dimensions.

## S-D "WHOPPER" END-DUMP CAR

With our cantilever construction, heavy structural steel side truss members easily support the heaviest load without sagging. They are attached to the rugged cross cantilever members at the body corners and run from one end of the body to the other. This car has Drop Axles and Armor plate bumpers. No other design of End-Dump car approaches its simplicity, strength, ruggedness and long life. No binders on side to strip off.



## S-D "WHOPPER" ROTARY-DUMP CAR

Cantilever construction. Maximum capacity. No binders to strip off against ribs. No unnecessary weight. Easily repaired. Supporting all the weight on the flares are the massive crosswise cantilever structural members at the ends of the car body, resting on and attached to the rectangular steel truck frame. Simple, strong. Pan Bottom. Drop Axles. Armor Plate Bumpers.

## For Increased Production and Drastic Savings Change Over to S-D 1-2-3 "Automatics"

★ You can easily discharge 15 to 20 S-D "Automatic" cars of coal a minute . . . a big saving in time compared with End-Dump or Rotary-Dump cars of equal capacity. In addition, the S-D 1-2-3 "Automatic" doesn't dump the coal, it lays it down gently through one door opening at a time . . . reducing breakage of coal to the minimum.

The S-D "Automatic" leads an easy life compared with End-Dump and Rotary-Dump cars, and, consequently, it lives much longer. The resultant savings in maintenance is a big item. Changing over to S-D 1-2-3 "Automatics" will pay you well. Investigate them now.



*Sanford-Day Iron Works, KNOXVILLE, TENNESSEE*



# Lower Tonnage Cost and Longer Belt Service from **REPUBLIC ENGINEERING**

**M**ODERNIZATION projects in the industry will bring about the handling of vast tonnages of coal in mines and processing plants. Equipment must be in condition to meet this demand. Republic engineers know that quality is determined by the ability of a conveyor belt to handle the required load without failure, and to give long, economical service. Combining

the fruit of scientific research, man-made rubber, with "for-the-job" design, and honest workmanship, Republic produces conveyor belting to these standards. Super Excelo Reprene and Record Maker-S are recognized as top quality products in their respective service classifications. Consult your Republic Distributor on the correct belt for each coal conveyor installation.

## REPUBLIC RUBBER

DIVISION

LEE RUBBER & TIRE CORPORATION

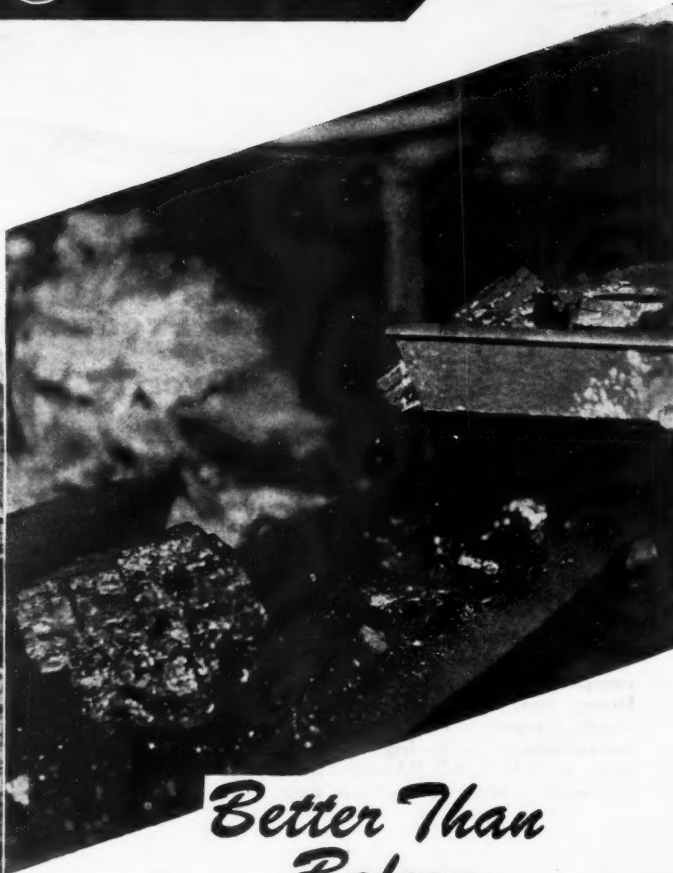
YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS  
YOUNGSTOWN, O.

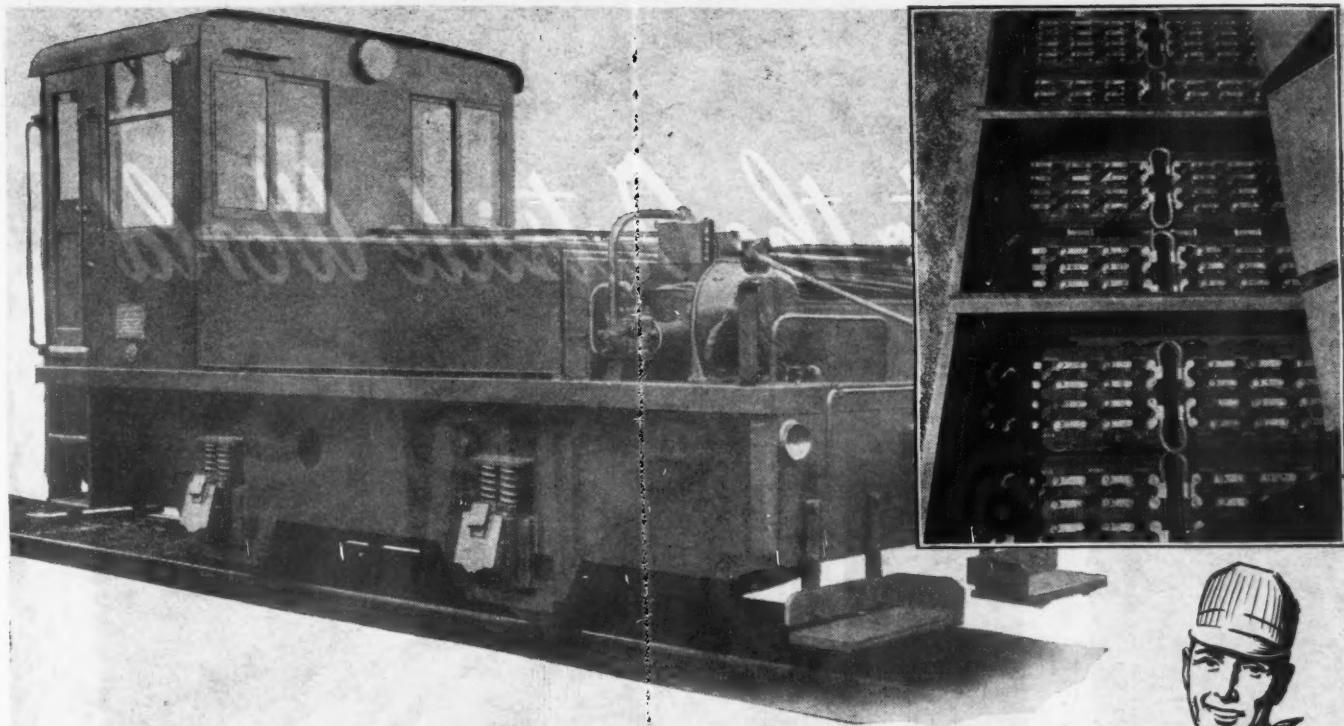


LEE DELUXE TIRES AND TUBES  
CONSHOHOCKEN, PA.

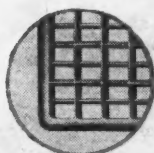
WE ARE  
PARTICIPANTS IN THE  
OWNERSHIP AND OPERATION  
OF  
NATIONAL SYNTHETIC RUBBER  
CORPORATION



*Better Than  
Before*

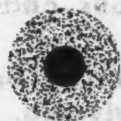


## They chose **A BATTERY WITH** *20 years of experience!*



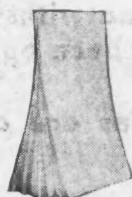
### **KATHANODE GRID**

Double wedge design of grid members gives strength and resistance to peroxidization.



### **BLACK OXIDE**

Unique cores of pure lead give this positive active material unusually long life.



### **SPUN GLASS MATS**

Of exclusive Gould design, these mats are 90% porous yet positively hold active material in place.

When Gould began the manufacture of Kathanode Glassklad batteries in 1925, the use of spun glass mat retainers was a radical battery innovation. Today it is acknowledged to be the best method for retaining active material in the positive plate.

Behind each Gould Kathanode battery of today are 20 years of service in every field where

storage batteries must meet daily cycle demands. It has proved itself time and again to be a better battery... efficient in operation and capable of meeting current needs in excess of rated capacity.

*That's why a large midwest utility company chose Gould Kathanode to power its electric locomotive pictured here.*

There is a Gould Kathanode that will do a better job for you. Write today for Catalog 300 on Gould Kathanode Glassklad Batteries for Mine-Shuttle Car Service.

# GOULD



SINCE 1898...THE BATTERY PICKED BY ENGINEERS

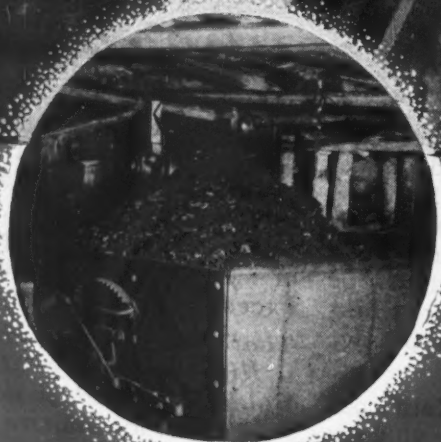
FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

GOULD STORAGE BATTERY CORPORATION, Depew, New York. Factories: Atlanta • Chicago • Dallas • Depew • Leominster  
Los Angeles • North Bergen • Rockland • St. Paul • Sioux City • Zanesville



CONVEYING

# COAL *to the Outside World*



Underground coal conveyor belts are fighting against tremendous odds every hour of the day.

Here is a BWH conveyor belt in a large coal mine in Pennsylvania, operating as a "gathering conveyor" because it gathers the discharge from various room conveyors and carries the coal to the cars. This is severe service involving tandem drive, right angle feed, large pieces and uneven distribution of load. Yet notwithstanding these difficulties, this belt has met all conditions and has been operating many years.

Wherever extremely hard conveyor belt installations are contemplated, be sure to get in touch with our nearest distributor or field technician, or write us direct.

## BOSTON WOVEN HOSE & RUBBER CO.

WORKS: CAMBRIDGE, MASS., U.S.A.  
P.O. BOX 1071, BOSTON, MASS., U.S.A.



***for taking up bottoms  
and utility drilling***



## **LIGHT-WEIGHT CP-22 SINKER**

**L**IGHT, perfectly balanced and easily operated by one man, the CP-22 Sinker speeds brushing down, taking up bottoms, coal drilling, and general maintenance work. Its high speed, penetrating blow and efficient hole-cleaning substantially reduce drilling time.

Designed for long service and low maintenance, the CP-22 Sinker is fully cushioned and

automatically lubricated. Due to its low air consumption, the CP-22 Sinker Drill is ideal for operation with a portable air compressor.

Chicago Pneumatic manufactures a complete line of dependable Sinker Drills, Drifters and Stopers. Write for details.

★★★★★★★★★  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
HYDRAULIC TOOLS  
ROCK DRILLS

**CHICAGO PNEUMATIC**  
TOOL  COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES





**"CAN U.S. MANUFACTURERS  
MATCH COAL'S NEEDS  
POSTWAR?"**  
... asks COAL AGE

*Speaking for ourselves, the*

In a recent advertisement of its own, Coal Age raises the following pertinent question:

*"From one startling angle, there is doubt in the minds of coal operators concerning the postwar years. They are wondering whether U. S. manufacturers will be able to supply them with enough machinery, equipment, and supplies!"*

Naturally, we of A.C.F. cannot speak for the supplying industry at large, but



We will supply the very best quality Chilled Tread Mine Car Wheels, which as manufactured under our heat-treating process, are made from a special mixture of metals—better for mine car wheels than iron or steel, alone. We will continue to supply new trucks, axles, bumpers and electrically welded end sills with spring bumpers to recondition your older cars.

**a.c.f.**

**A**  
NEW



*the answer's YES!*

we can speak for ourselves, and the answer is a big YES! We will supply the mines with the finest in new mine cars for every purpose, for every practical capacity, for the greatest haulage efficiency. In construction and design these cars will combine all the features that have proved themselves through the years, plus trucks with anti-friction bearings, automatic drop bottom advantages and other modern cost-reducing equipment.

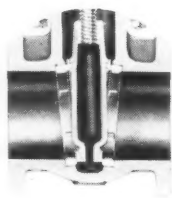
## AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK • CHICAGO • ST. LOUIS • CLEVELAND • PHILADELPHIA • BERWICK, PA. • PITTSBURGH • HUNTINGTON, W. VA.

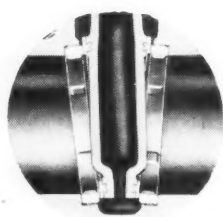
# WALWORTH PRESENTS *A New Line of* IRON BODY GATE VALVES with screwed or flanged ends



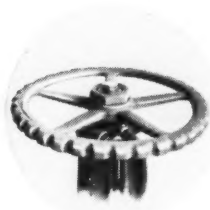
## ... 8 Outstanding Features



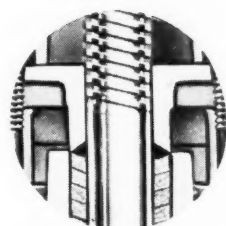
**Straight-Flow Port Design** reduces fluid turbulence to a practical minimum.



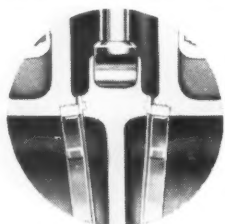
**Seat Rings** of end-seated type are screwed into the body.



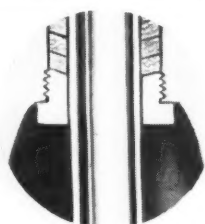
**Sure-Grip Malleable handwheel** for non-skid gripping even with heavy gloves.



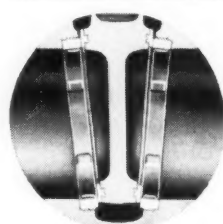
**Brass Liner on Glands** assures greater resistance to corrosion and scoring.



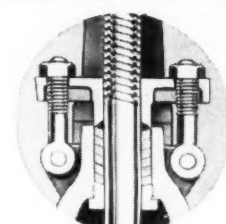
**T-head disc-to-stem connection** on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



**Bronze back-seat bushings** in bonnets of OS&Y valves. (As soon as W.P.B. Limitation order permits.)



**Solid Web Type disc** in OS&Y valves for greater strength and longer service.



**Hinged Gland Eye-Bolts** on OS & Y valves permit faster, easier repacking under full pressure.



12 AWARDS  
TO 4 PLANTS

# WALWORTH

## valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For Complete Information on these new Walworth Iron Body Valves, write for bulletin 106.



## O-B BULLDOG FEEDER TAP

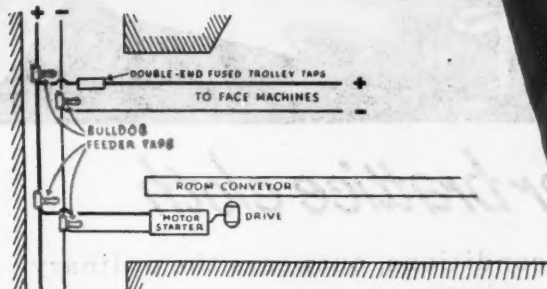
Nos. 20469-70-71

**ELIMINATE  
"MAKESHIFT"  
FEEDER TAPS**

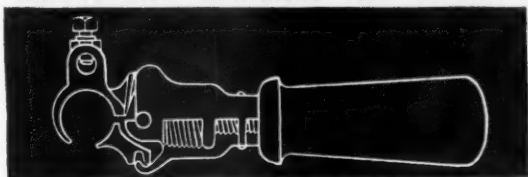
**Connect Trailing Cables  
to Feeder System Safely  
and Positively With New**

**O-B Bulldog  
Feeder Tap**

2555-M



Typical roomneck layout showing O-B Bulldog Feeder Taps being used to connect both room cables and motor starter leads to feeder system.



Sectional view of Bulldog Feeder Tap showing how the twisting of the handle and head nut controls the opening of the jaws. Main clamping jaw is made of bronze.



Jaws of Bulldog Feeder Tap are secured to cable by turning safe, rubber-covered handle. Because machine cable is attached to main clamping jaw, tendency for it to twist as clamp is tightened is eliminated.

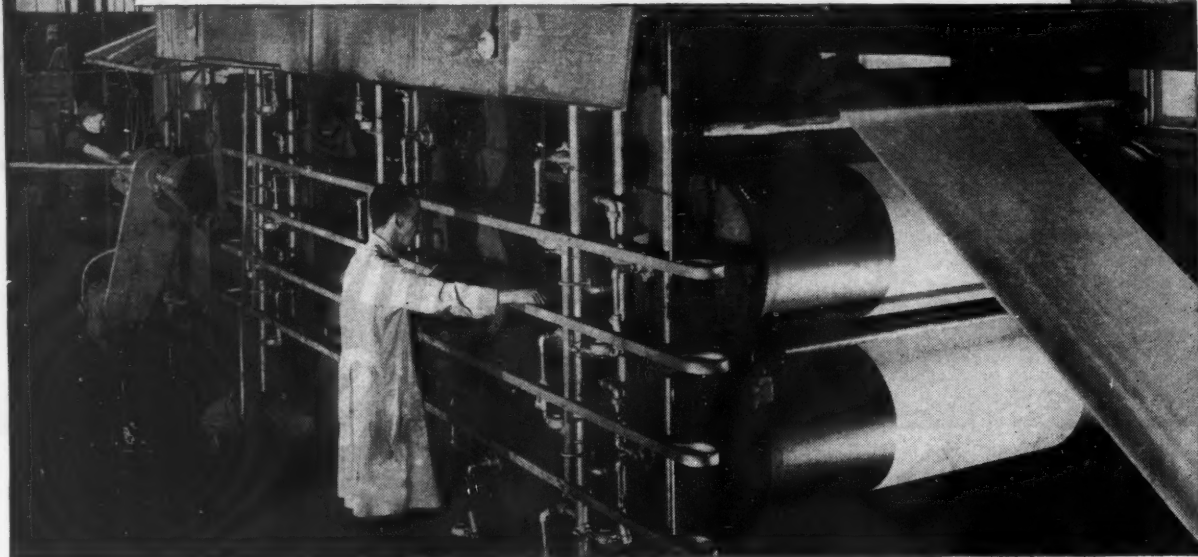
Three Sizes Available	For following range of bare feeder cable sizes...	And accommodating machine cables up to...
20469	4/0 to 350,000 circ. mil.	No. 1
20470	500,000 circ. mil.	No. 1
20471	1,000,000 circ. mil.	No. 1

**Ohio Brass**

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

## FLOCKER uses this exclusive process



... to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew ... stays clean longer and, under identical

### PROVED SUPERIORITY IN COTTON OR JUTE

**SUPERIOR FIRE-RESISTANCE**—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

**SUPERIOR MILDEW REPELLENCE**—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

**STAYS CLEAN**—Does not collect mildew "whiskers"—hence no slimy dirt.

**LONGER SERVICE**—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth ... and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

## JOHN FLOCKER AND COMPANY

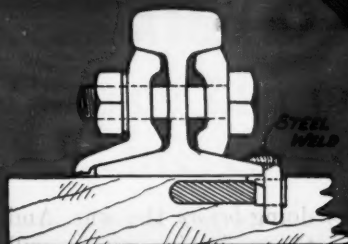
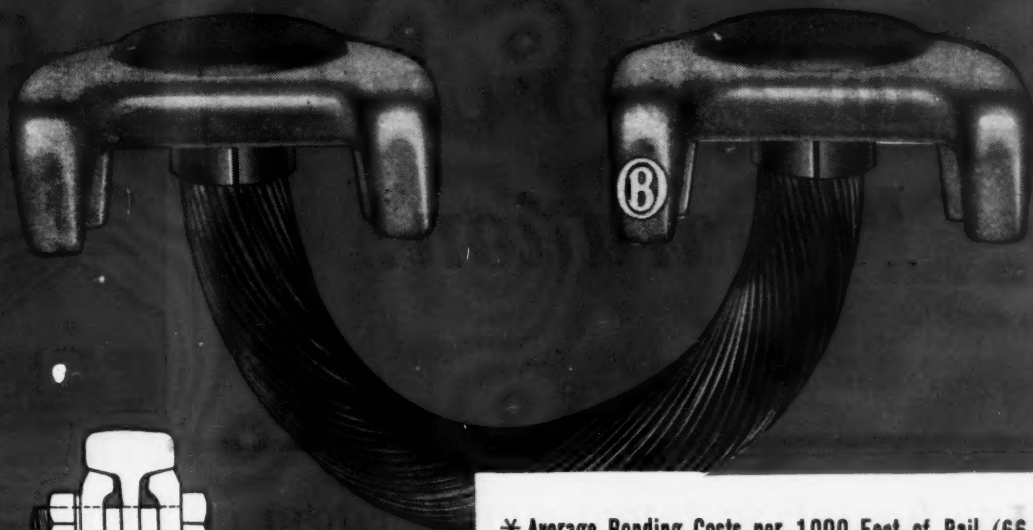
644 GRANT STREET, PITTSBURGH 30, PA.

*Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen ... Specialists in Cordage Problems ... Wire Rope*

Let O-B Type AW-19 Rail Bonds

*Save  $\frac{2}{3}$*

of Your Main Line Welded Bond Costs\*



O-B Type AW-19 Rail Bonds may be installed on any rail 50 lbs. or heavier. Notice how bond strand lies under rail base, protected from damage due to dragging equipment or derailment.

\* Average Bonding Costs per 1000 Feet of Rail (66 Joints)  
(Based on Ten Year Period)

	LONG BOND	AW-19
Bonds	\$ 66	\$ 39
Installation	33	33
Power Loss Due to Bond Resistance	320	70
	<u>\$419</u>	<u>\$142</u>

Savings--\$277 or approximately 66%

**30% Less Initial Investment** - Type AW-19 Bond costs approximately \$40 per 100 less than long bonds. On a six-mile haulage, this savings would amount to nearly \$800.

**12% More Current Carrying Capacity--75% Less Power Loss Due to Resistance** - Type AW-19 Bond requires but  $\frac{1}{4}$  as much strand as long bond; introduces but  $\frac{1}{4}$  as much resistance in return circuit. It will also carry approximately 95% of rail conductivity as compared to 83% with long bond. At average power costs, savings on six-mile haulage, would amount to \$1300 yearly.

★  
KEEP BUYING  
WAR BONDS

2559-M  
*Ohio Brass*

MANSFIELD, OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONTARIO



# To get Better Prices Arrange NOW for Better Coal Preparation\*!

**MORROW** is ready to help you.



150 ton derrick barge built for Maritime Commission

SINCE 1941, we have been building barges and cranes etc., for active service in the war against Germany and Japan. Also, during this time, we have spared no effort to see that orders for coal tippie repair parts were shipped promptly. We feel we have reason to be proud of this wartime record.

Now completion of Government contracts is in sight—but production of coal has become increasingly essential.

When peacetime competition resumes, clean coals—of low impurity content, correct sizing and uniformity—will win the better markets, the higher prices—as they were

doing before the war. And the race to mechanize mines will resume.

So—whether it is your purpose to maintain preparation equipment at maximum efficiency now, by replacement or repair—or to plan for improved post-war production—now is the time to consult Morrow. Morrow streamlines production through modern, efficient preparation equipment in shorter time, at lower costs—in the best condition to SELL.

Morrow will gladly assign an engineer to study your situation. Write The Morrow Manufacturing Company, 1943 Ford Blvd., Wellston, Ohio. Division The Wacker Corporation.

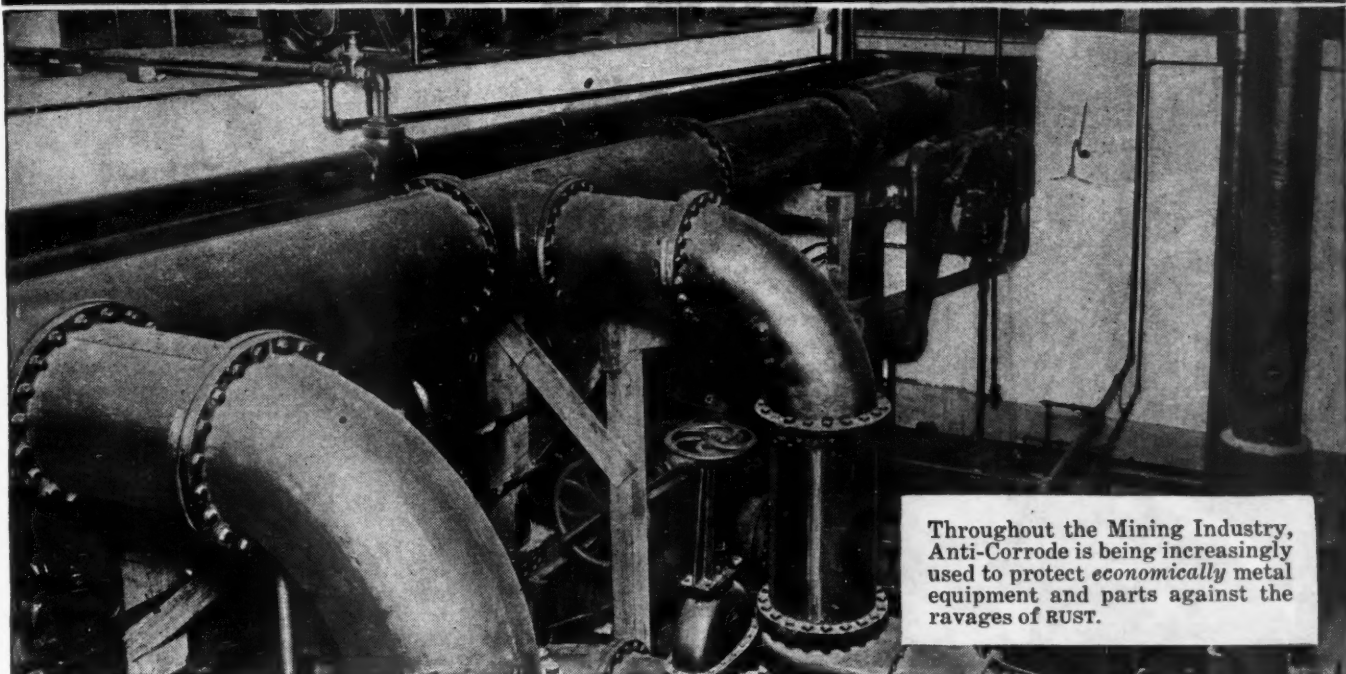
\* Better Preparation  
= INCREASED SALES!

1. low impurity content
2. correct sizing
3. high uniformity

## MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS  
BINS AND BIN GATES • FLANGED LIP SCREENS  
CONVEYORS • LOADING BOOMS • SHAKING SCREENS  
VIBRATING SCREENS • CAR HAULS • PICKING TABLES  
SETTLING TANKS • ELEVATORS • CAR RETARDERS  
PERFORATED METAL SCREENS • STEEL STRUCTURES

# STOP RUST *this New, Efficient Way—*



Throughout the Mining Industry, Anti-Corrode is being increasingly used to protect *economically* metal equipment and parts against the ravages of RUST.

## Anti-Corrode film protects your metal parts and equipment ... prevents corrosion and rust formations

Anti-Corrode #100 is one of several new types of Cities Service protective coatings for metals. Designed to prevent corrosion of raw stocks, finished parts and completed machines—either in storage or in active service—Anti-Corrode adheres firmly to metal surfaces, displaces moisture and protects longer than similar materials now on the market.

Cities Service Anti-Corrode #100 may be applied by ordinary work-shop methods—spraying, dipping, brushing or rolling. Independent of metal quality, finish and irregularity of surface, the protective film is continuous and non-porous—does not break at sharp edges nor rupture on flat surfaces.

Cities Service Anti-Corrode #100 serves as a lubricant as well as a rust preventive and need not be removed from metal to be stamped, drawn, or otherwise formed. It can be removed simply with kerosene or any petroleum solvent.



CITIES SERVICE OIL COMPANY

ARKANSAS FUEL OIL COMPANY

# ANTI-CORRODE

SAFEGUARD FOR THE MINING INDUSTRY

### ANTI-CORRODE Gives You 10 BIG ADVANTAGES

1. Adheres to all metal surfaces.
2. Impervious to humid atmospheres.
3. Water-repellent.
4. Resistant to sun rays.
5. Chemically inert to ferrous and non-ferrous metals.
6. Inhibits "under" rusting.
7. Easy to apply—easy to remove.
8. Lubricates as it conserves.
9. Will not become brittle.
10. Protects metals in service or storage.

Whether your problem is to protect a single valuable tool or a million dollars worth of metal or equipment, write now for a free demonstration of Anti-Corrode. Mail the coupon today.

Cities Service Oil Company

Room 300

60 Wall Tower, New York 5, N. Y.

Gentlemen: Please contact me for a FREE demonstration of Anti-Corrode in our plant. (This offer limited to industrial users in Cities Service marketing areas East of the Rockies.)

Name .....

Position .....

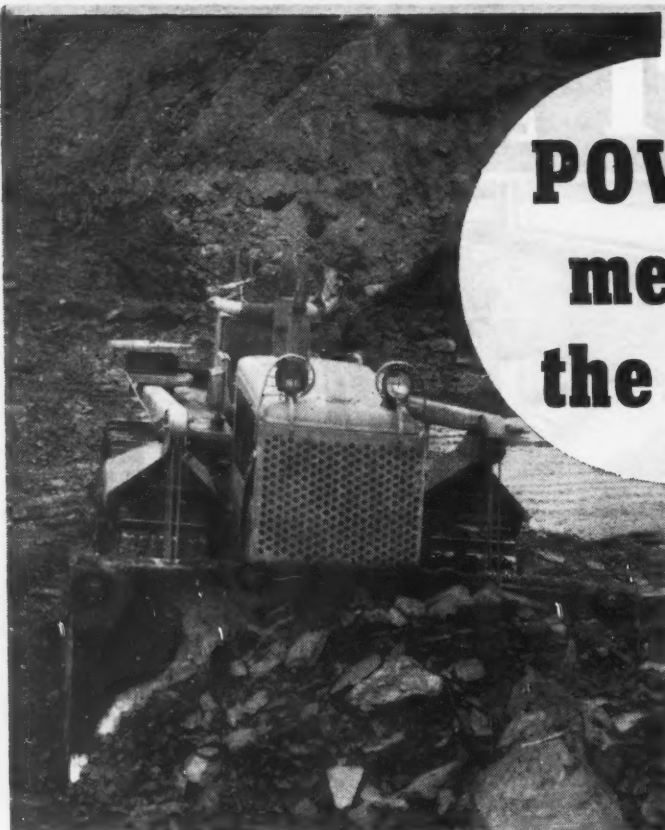
Company .....

Address .....

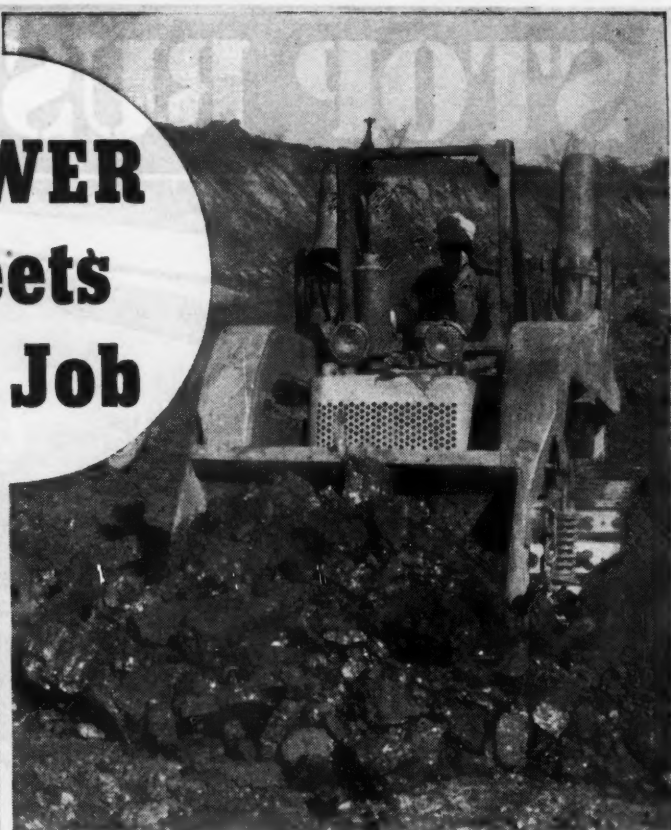
City ..... State .....



# POWER meets the Job



International TD-18 Diesel crawler tractor with cable dozer handling slate from a 30-inch seam in Missouri.



International TD-9 Diesel crawler tractor with 3/4-yard dozer shovel at work on a 15-inch seam of high grade coal in Kansas.

## International Power Fits Strip Mine Operations

- International Power teams up with equipment to fit the job, to give you profitable, low-cost production; keep operations on schedule; handle overburden efficiently; and keep maintenance at a minimum.

International Harvester TracTracTors —full Diesel or gasoline—are built in four sizes, ranging from the sturdy TD-6 Diesel to the big TD-18 Diesel. Each offers a full measure of performance in its power range.

Until peace comes, most of the

International TracTracTors being manufactured are going to the war fronts. Needs here at home must wait. That's why all operators are urged to take the best possible care of their equipment and make it do.

When service is needed see the International Industrial Power distributor for parts and maintenance. Let him help you keep your present equipment *profitably* on the job.



INTERNATIONAL HARVESTER COMPANY  
180 North Michigan Avenue Chicago 1, Illinois

## INTERNATIONAL Power for the Mines



**EVEN TIGER BRAND NEEDS IT!**



## Add life to your wire ropes with LUBRICATION

ONE of the most frequent causes of premature wire rope failure is lack of proper lubrication. Yet lubrication is such a simple means of extending rope life that it seems incredible that rope users should overlook it. But they do.

Every American Tiger Brand Wire Rope comes to you from the factory, properly lubricated and ready for service. But factory lubrication, no matter how efficient, will not last the life of the rope. Field lubrication at regular intervals is absolutely essential. Wire rope is a machine, composed of many working parts. It re-

quires periodic lubrication to reduce frictional wear.

Use a well-tested lubricant like Tiger-Lube which has been developed through years of study and research. Be sure that the rope surface is clean and that the lubricant is applied uniformly and thoroughly.

Lubrication is insurance against corrosion and is the safest way to prevent excessive internal and external rope wear. Lubrication will materially assist in controlling the wear on sheaves and drums and in prolonging rope life, resulting in increased operating efficiency.

**AMERICAN STEEL & WIRE COMPANY**  
Cleveland, Chicago and New York

**COLUMBIA STEEL COMPANY**  
San Francisco

United States Steel Export Company, New York



*Excellay Preformed*

**UNITED STATES STEEL**

*Now*

**LAY-SET**

*is* **A**



The new **GREEN LUBE**, made to Hazard's own specifications, clings to the wires better, thereby affording increased protection. Wires wear longer; the entire rope gives longer service. That is why every strand in **LAY-SET** Preformed I.P.S. is packed to the point where every void is completely filled with this superior lubricant.

**ACCO**

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Conn.



**HAZARD WIRE ROPE DIVISION  
AMERICAN CHAIN & CABLE**

*In Business for Your Safety*

# **PREFORMED I.P.S.\***

# **ALL GREEN!**

Here is the ultimate in wire rope perfection.

...Hazard **LAY-SET** Preformed made of Improved Plow Steel \*...every strand of which is literally stuffed with our superior green lubricant...the best of all rope made still better by the more adhesive green lubricant which coats every wire.





Have you met  
"MONOBEL" AA?



**A dependable, low-cost,  
water-resistant permissible developed  
for wet work and hard-shooting coal**

"Monobel" AA was developed by Du Pont research for use in coal mines where the working is wet and where thick, hard-shooting coal is encountered.

It's a strong low-velocity ammonia permissible that has been proved thoroughly dependable in wet work. "Monobel" AA is waterproofed by a basically new method and costs less than the gelatinous permissibles used for similar work.

"Monobel" AA produces firm, coarse coal, yet breaks it down sufficiently to facilitate mechanical loading. Tests show that by its use a charge can be readily concentrated in the back of the hole . . . which results in more efficient shots . . . squares up the face and shears the ribs better.

Try "Monobel" AA. Operators agree that it performs well regardless of whether top or bottom cutting is practised, and that it will do ordinary rock and slate shooting in any mine. Talk with your Du Pont representative for complete information. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

Kitchen fats are  
needed now. Urge  
housewives to save  
and sell them.



**DU PONT  
PERMISSIBLES**

**Blasting Supplies and Accessories**

**FOR PEAK PRODUCTION**

**ROME "60-38"**

**Single Conductor  
Locomotive  
Gathering Cable**

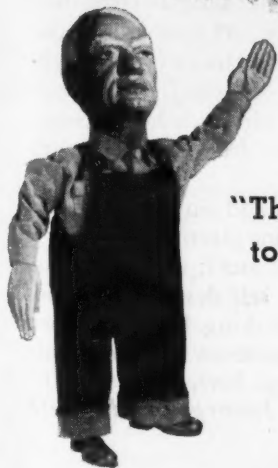
Doing the roughest, toughest job in the mine, the famous Rome "60-38" takes it on the chin day and night for months and months of continuous service, keeping mine locomotives moving uninterruptedly for maximum output.

**THE CONDUCTOR** is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

**A SPECIAL INSULATION** is used which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.

**HEAVY TWINE REINFORCEMENT CORDS** are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

**THE NEOPRENE JACKET** is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.



"This is mighty  
tough stuff"—  
says Romey

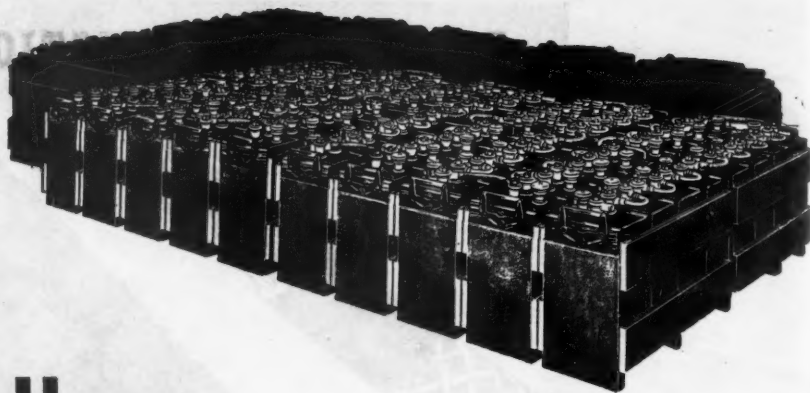
FROM BAR TO FINISHED WIRE

**ROME CABLE  
CORPORATION  
ROME • NEW YORK**



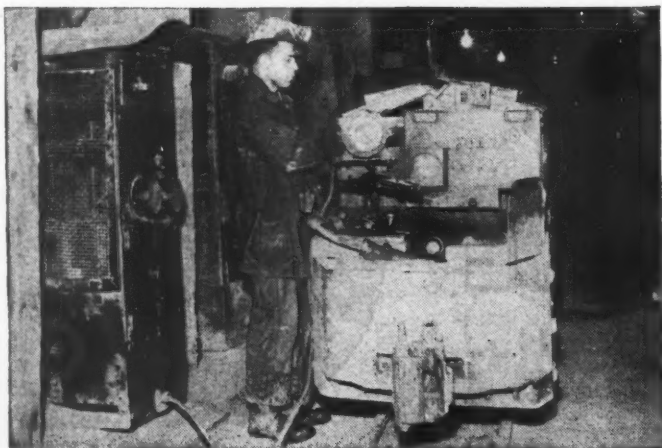


# Lives a DOUBLE LIFE ... For Many Users



## In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically**; are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They are **simple and easy to maintain**.
- They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.



An indication of the unequaled dependability of Edison Alkaline Batteries in mine haulage services is the fact that many users are getting a "second life" from them. After delivering normal service life in locomotives and shuttle cars, alkaline batteries are often regrouped and re-applied to various kinds of lighter-duty work for which their capacity is still adequate. In these "new" applications such as signals, alarms, switch controls and emergency lighting, the batteries give more years of dependable service.

More and more operators are getting this extra battery life, especially with war-created scarcities and the need to conserve. Thus in effect they are getting new batteries *free*. Yet they could not afford to entrust "worn-out" haulage batteries with other equally important, though lighter, loads if they had not already discovered that alkaline batteries remain dependable power units beyond their normal service life. The fact they do live this "double life" is your assurance of getting the nearest approach to failure-free haulage power it is possible to obtain, when locomotives and shuttle cars are equipped with alkaline batteries.

The reasons are few and simple: steel cell construction; an alkaline electrolyte that is a natural preservative of steel; a principle of operation free from self-destructive reactions. Because of their long life and other advantages, alkaline batteries help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.*

**Edison**  
ALKALINE BATTERIES

A ham  
that's al  
No. 5 S  
as fast  
The c  
get the  
about g  
the tie  
snug ag  
into plac  
to bear  
loading  
The B  
rail. It's  
stout sec  
easy to c  
No one  
makes po  
-speed



# YOUR GREENEST MAN CAN DO IT



A hammer, two hands, and a couple of minutes—that's all you need to install or remove a Bethlehem No. 5 Steel Tie. Sounds pretty simple—and it's just as fast and easy as it sounds.

The greenest man in your track-laying crew can get the hang of it in no time. He doesn't have to worry about gaging track or spiking. All he does is slip the tie under the rails . . . bring the stationary clips snug against the flanges . . . tap the revolving clips into place. There's your tie, fastened securely, ready to bear the full weight of your heaviest cutting and loading machines.

The Bethlehem No. 5 is built for use with 40-lb. rail. It's a sturdy worker, rigid and durable. Good stout section; strong as only steel can be. Yet it's easy to carry around; weighs only 5 lbs. per ft.

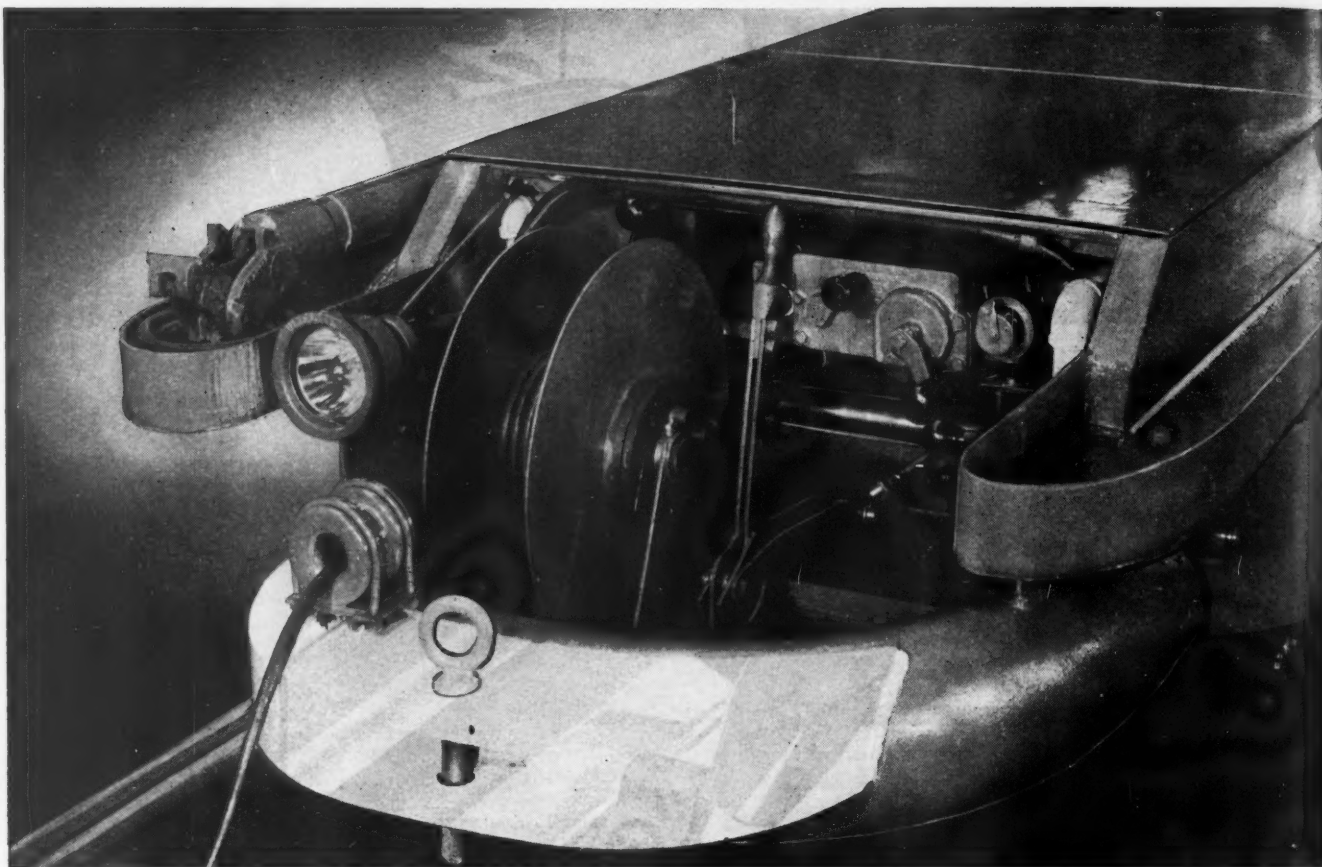
No one feature accounts for the savings the No. 5 makes possible. Rather, it's a combination of features—speed of installation, absence of spiking and gag-

ing, and long service life. You'll still be using it after several wooden ties have been spike-killed and thrown away.

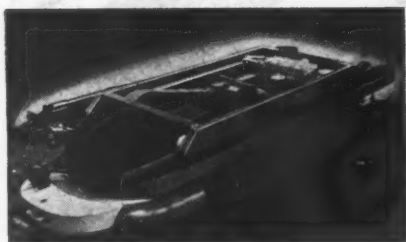
For your next 40-lb. track in rooms, be sure you get the bright red Bethlehem No. 5's. In the case of these ties, red means "Go!"

## BETHLEHEM STEEL TIES

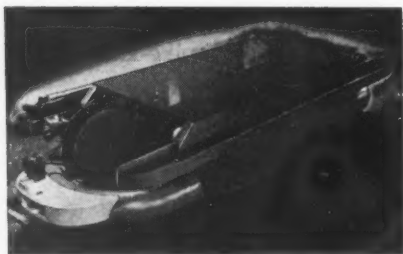




Control end of Cantrell Type SP Compressor is shown above.



Cantrell SP Compressor with safety top removed



—with top in place

*Give your drill crew a Cantrell SP and you give them the finest; the fastest; the most economical compressor known!*

## Need A 2-TON Locomotive —Plus COMPRESSOR?

• TODAY, NO MINE IS FULLY EQUIPPED WITH ESSENTIAL OPERATING MACHINES WITHOUT A CANTRELL SELF-PROPELLED AIR COMPRESSOR! HERE ARE A FEW OF THE REASONS WHY.

• • •

Air compressor service is an absolute necessity for numerous jobs in any mine. Yet, many mines are falling short of complete compressor service simply because the time and expense required to get present compressor equipment to and from the job is too great to justify its use.

The Cantrell, Type SP, compressor is revolutionizing compressor service in coal mining. No longer need you tie up a costly locomotive with crew for moving an air compressor from job to job, along with an extra car for hauling tools and repairs.

The Cantrell, Type SP, is more than a heavy duty air compressor. It is a self-contained locomotive, capable of

rapid tramping to any point. Upon arrival at job, power is instantly changed from tramping to compressor . . . as simply as changing gears in an automobile. In addition, space for hauling tools and repair equipment is provided in the Cantrell SP. Mines using the Cantrell SP will tell you it is indispensable to efficient mining. In addition to regular drilling work, you use the Cantrell SP for ditch lining, leveling haulways, hauling repairs, shifting pumps and mining machines, chipping, riveting, blowing substations, and, it takes you there, gets the job done, brings you back . . . all under its own power . . . a new, broader service in a complete air compressor. Write for complete details now, to Imperial Bronze Manufacturing Co., Jellico, Tennessee.

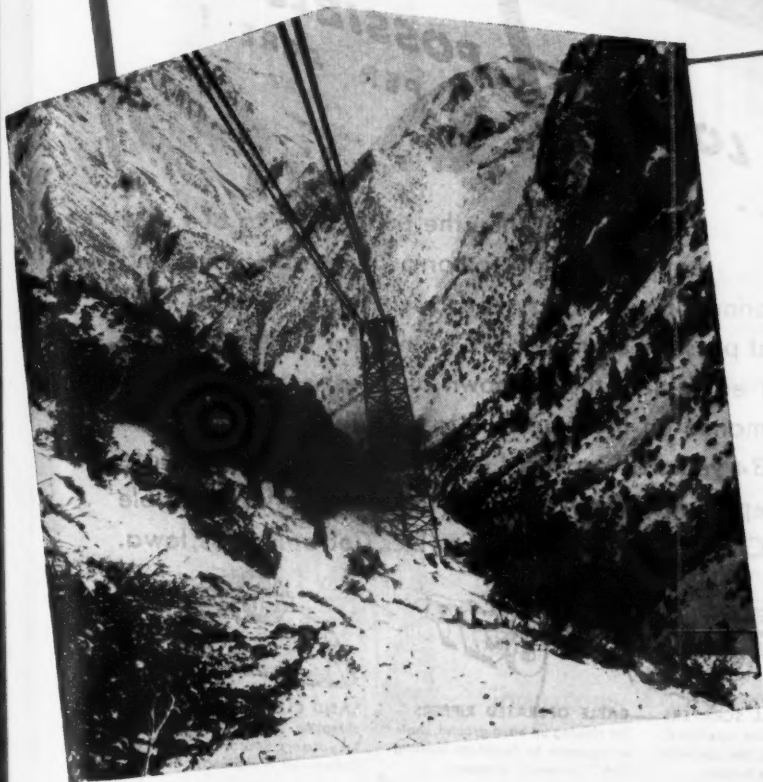
**Cantrell**  
**COMPRESSORS**

**This all-weather route  
makes operations  
profitable 12 months  
of the year!**

(Right)—175 tons of coal per hour are carried over this U-S-S American Aerial Tramway which is operated by the Electro Metallurgical Company, Alloy, W. Va.

(Below)—100 tons of tungsten ore per hour go down to the mill of U. S. Vanadium Corporation in the High Sierra Mountains of California.

**Neither topography  
nor temperature  
affects aerial tramway  
transportation**



**T**HE modern aerial tramway is often the *cheapest distance* from mine to mill or railroad.

Regardless of weather and climatic conditions, rivers, ravines and mountainous cliffs offer no insurmountable obstacle to the aerial tramway. Whether the distance is a few hundred feet or several miles, you can quickly, safely, and economically move up to 300 tons per hour.

The more difficult the ground conditions, the heavier the load, the greater your ultimate ton-mile savings.

As one of the foremost designers, manufacturers and erectors of aerial wire rope tramways, American Steel & Wire Company welcomes an opportunity to help you solve your "mine to mill or railroad" transportation problems. An inquiry on your letterhead will bring interesting facts.

**American Steel & Wire Company**

*Cleveland, Chicago, and New York*

**Columbia Steel Company**

*San Francisco*

United States Steel Export Company, New York

**UNITED STATES STEEL**

*U-S-S American Aerial Tramways*



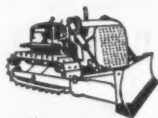


# SPOTTING THE MARK



**That Means LOWEST POSSIBLE COST**  
**PER YARD . . . PER TON . . . PER ACRE !**

When the time comes to buy new equipment for tomorrow's earthmoving and land clearing jobs, it will pay you to remember the mark LPC, as your guide to lowest possible cost. For LPC stands for LaPlant-Choate—the job-proved line of tractor equipment that's known and respected the world over for its outstanding performance on thousands of tough jobs. Designed and built by "specialists" with over 34 years of practical "know-how," LaPlant-Choate equipment will continue to be a step ahead in improvements that assure lowest possible cost per dollar invested. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



**ALL TYPES OF DOZERS\***—Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



**LARGE OR SMALL SCRAPERS**—Hydraulic or cable operated, front or rear dump, for use with wheel or track-type tractors.



**CABLE OPERATED RIPPERS**—For ripping up hard ground, shale or concrete to facilitate loading with "Carrimor" Scrapers.



**LAND CLEARING TOOLS**—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all interchangeable.

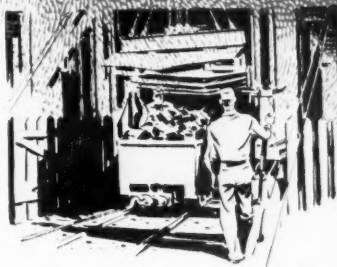
\* Again in '44, LaPlant-Choate delivered more dozers to the armed forces and other essential users than any other company in the industry—almost as many as all the other manufacturers combined



**LAPLANT**  
 EARTHMOVING AND LAND



**CHOATE**  
 CLEARING EQUIPMENT



**P**PRICE tells something of quality in wire rope . . . but performance tells more! Performance comes from what is put into the rope, and who put it in. The maker means more than the material, price, specifications . . . In years of hard jobs the world over, in records of cost and safety, in war service on land and sea and in the air . . . Rochester ropes have made Rochester a good name in wire rope . . . Today, all our output goes to government and high priority industries. Tomorrow, when you can get all the wire rope you want, remember Rochester when you want the best!



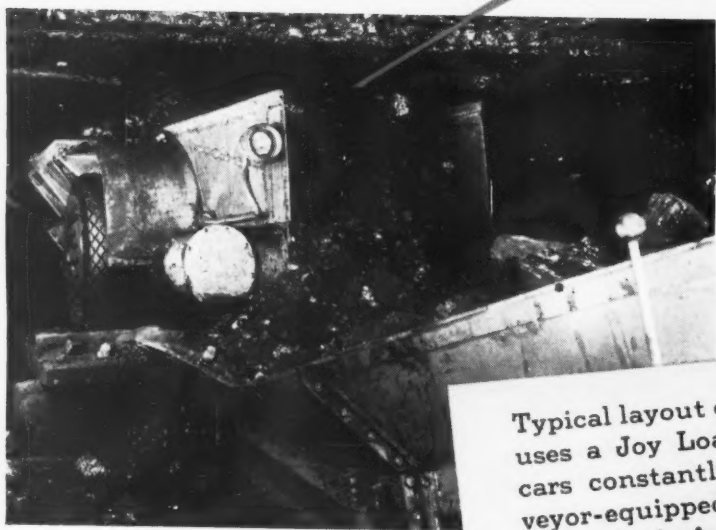
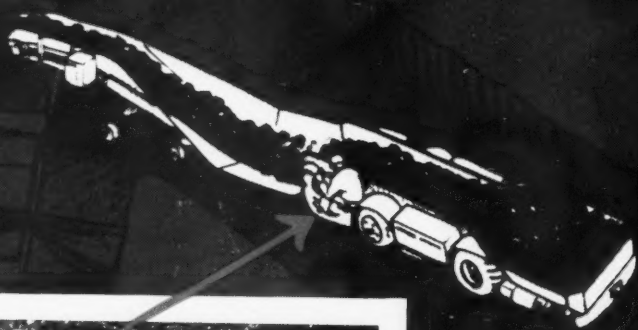
Jamaica, N. Y., plants

**ROCHESTER** *Ropes*

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

# JOY MECHANIZED MINING

*handles coal fast...  
at low cost per ton*



Joy Elevating Chain Conveyor handles coal from shuttle car into the mine car.

Typical layout of a shuttle car mine which uses a Joy Loader to keep three shuttle cars constantly on the move. The conveyor-equipped bottoms of the shuttle cars greatly facilitate even distribution of the load and permit quick unloading at the main entry.



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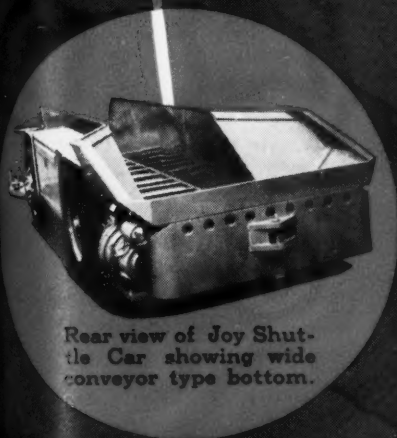
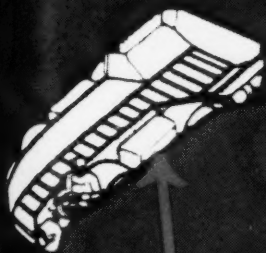
Speedy handling is the keynote of today's wartime production. And speedy handling . . . with emphasis on the economy of operation . . . will be the factor that determines whether you have red ink or black on your books in postwar years. Begin now to analyze your facilities once again.

Joy Shuttle Car Mining operations have

proved to be successful from the standpoint of speedy handling of large tonnage, as well as from a low operating cost viewpoint. Because Joy Equipment is especially constructed . . . sturdily built . . . economical to operate, it will pay you to investigate the possibilities of working it into your mining set-up.



Joy 11 Bu. Loader "digs in" a pile of coal. This same model may be adapted for hard-rock and ore mining.



Rear view of Joy Shuttle Car showing wide conveyor type bottom.



**JOY MANUFACTURING CO.**

FRANKLIN, PA.

*Call in a  
Joy Engineer*



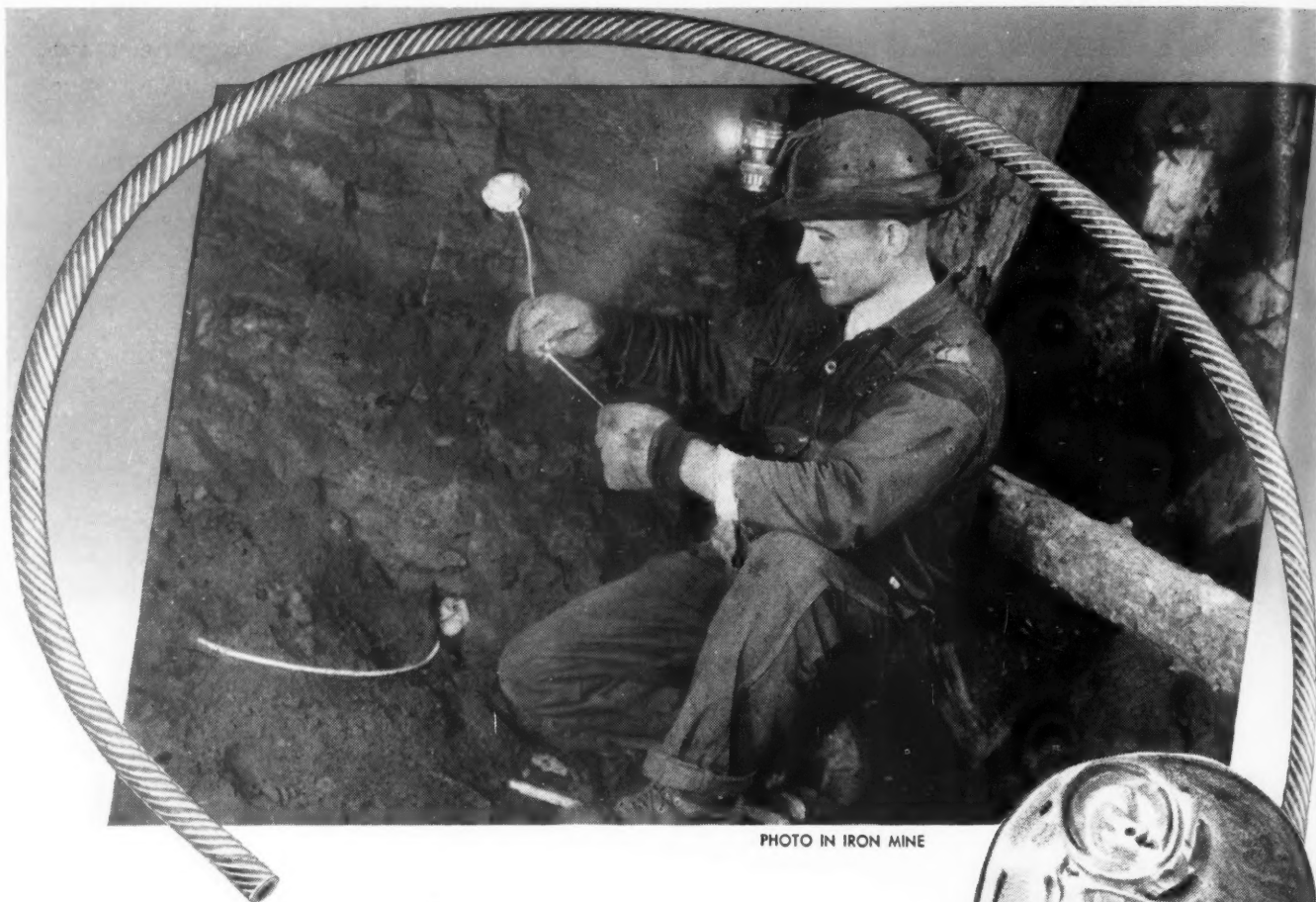


PHOTO IN IRON MINE

## Just half a dozen steps to Greater Safety

Tested and proved safest and quickest in mines, pits and wherever blasting is done, these easy-to-follow rules are so fundamental that they could bear repeating every day in the year.

**CUT** *Safety Fuse* squarely with a clean, sharp blade.

**SEAT** *Safety Fuse* snugly against the charge in the blasting cap.

**CRIMP** *Safety Fuse* and cap firmly together with a crimper only.

**CENTER** *Safety Fuse* and cap in the punched primer cartridge.

**TIE** *Safety Fuse* securely to the cartridge.

Never short-fuse! Leave sufficient *Safety Fuse* extending out of the bore hole.

There's no mystery to repeated successful shots when you're using Ensign Bickford *Safety Fuse* — and sticking to the rules.

S-14



**THE ENSIGN-BICKFORD COMPANY**  
Simsbury, Connecticut

Since 1836

Also Primacord-Bickford Detonating  
Fuse

# ENSIGN-BICKFORD *Safety Fuse*

# Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, Editor

## Manpower Efficiency

WHETHER it is fully aware of that fact or not, the United States has benefited mightily from the time, thought and money devoted by the coal industry over the years to making manpower more productive. With that firm foundation to build on, the industry was able to rise to new heights in supplying coal for the war effort in the face of declining manpower, stoppages, storm and flood, and all the other handicaps to operation under wartime conditions. Few, if any, other war industries can match coal's record of producing more and more with fewer and fewer.

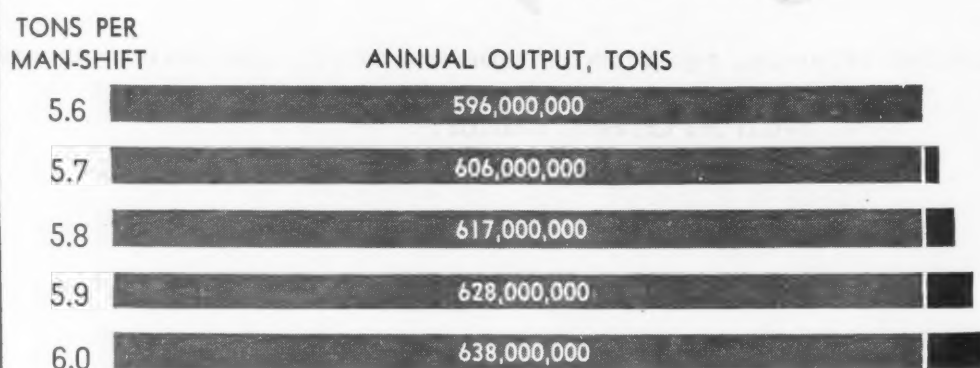
The race between manpower losses and increased productivity, however, has gotten tighter. With manpower drains continuing, coal, in fact, needs turn more than ever to higher individual output if it is to maintain tonnage at a level sufficient to ward off undue hardship for the nation in the critical period of the war that still remains.

And it is a critical period—a period in which a full-scale campaign must be completed in the Pacific. Men and materiel will remain at a premium until the Jap is beaten. Coal can make no better contribution to hastening final victory than an increase of 5 or 10 percent—or more—in output per manshift in 1945.

In building thus to further the war effort, coal also builds for a more prosperous peace to come. Higher efficiency has long been one of the mainstays of coal's plan for progress. It makes it easier to meet and beat competition, to pay better wages while keeping prices low, and to return the reasonable profit on investment that assures the necessary flow of capital into the industry. Higher efficiency benefits management and men as well as the consumer and the nation. It is a goal worthy of the best efforts of both, because it means earlier victory and a prosperous future.



## Every Fraction of a Ton More Output Per Man



**BITUMINOUS** (BASED ON 380,000 MEN WORKING 280 DAYS)

# Better Utilization of Mining Aids the War Effort and the

BETTER UTILIZATION of mining manpower has two vital objectives:

1. Meeting wartime tonnage goals—615,000,000 tons of bituminous and 65,000,000 tons of anthracite in 1945.

2. Ready the industry for the competitive battles of the future when cost and price again become a major factor.

Objective No. 1 is the paramount one for the duration. In reaching No. 1, coal also will be working most effectively to reach No. 2. Every step taken to utilize mining manpower more efficiently not only results in more coal for the war effort but puts the industry in a better paying position to continue to offer competitively priced coal in the future while paying good wages and returning reasonable profits to investors.

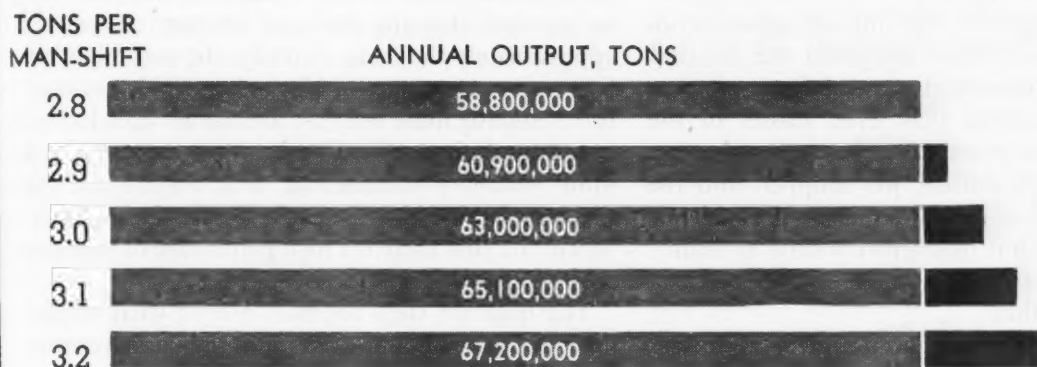
What might seem at first glance to be only a moderate improvement in utilization of mining manpower can result in substantial increases in production with corresponding decreases in mining cost. On the basis of the best available estimates of employment and productivity per man in anthracite and bituminous, some of the tonnage possibilities are shown in the accompanying charts. Increasing output per man-shift from the estimate of 5.6 tons in 1944 to 6.0 would raise the annual bituminous output in 1945 to 638,000,000 tons, barring

stoppages. Raising it to only 5.8 tons per man would provide 617,000,000 tons, or slightly more than the goal of 615,000,000 tons now set as the minimum for 1945. Anything over that would provide a corresponding cost reduction in addition.

Increasing anthracite productivity from the estimate of 2.8 tons per man in 1944 to 3.2 would result in a production of approximately 67,200,000 tons in 1945, with a corresponding reduction in cost. Increased productivity therefore becomes extremely worth while from both the war and cost standpoints.

With the objective known, reaching it becomes a matter of management. One definition of management is "judicious use of means to accomplish an end." Machines and methods, plus the best possible use of the man's own natural abilities, are the means in this case, with the end an increase in his individual productivity. As his productivity increases, his certainty of holding his job and continuing to draw good pay checks increases, along with the expectation of reasonable earnings which will keep capital flowing into coal mining. The capital is necessary to provide the machines that enable the miner to produce and earn accordingly, and both are essential to the well-being and prosperity of the industry.

## Means Millions More Tons of Coal at Less Cost



**ANTHRACITE** (BASED ON 75,000 MEN WORKING 280 DAYS)

## Manpower Coal Industry

Management is a little more than the narrow view sometimes held that its principal function is the supervision of workmen. Rather, its major objective should be a constant search for better methods and better equipment for accomplishing the primary task—production at a profit and with good wages to workers. Management cannot shift its responsibilities to the worker nor expect the worker to make up for any shortcomings. But that does not excuse the miner from responsibilities of his own. He and management should be partners in an enterprise conducted for the benefit of the customer and as a result for their mutual advantage. If the industry is to progress as it should the miner therefore must offer a fair day's work for the money he receives and do his share to get the most out of the new and costly facilities installed to increase efficiency, improve quality of product and promote safer operation. Only then can he fairly claim a share in the benefits of modern equipment and practices.

If a man does not report for work, however, even the best methods and equipment are no substitutes. In these days of manpower shortages, therefore, management must more and more look into all possible methods of insuring that every available employee works every possible day the mines operate. Absence may be

involuntary—the result of injury, inability to take care of personal affairs or fatigue. While there is some question as to how far management can and should go into off-the-job matters, a number of operators have found that if done judiciously the results may be worth while. But where management has direct control of the conditions which might result in involuntary absenteeism, the need for tonnage and the possibilities of lower cost dictate the maintenance of working conditions as safe, healthful and comfortable as it is possible to make them. Voluntary absenteeism is a horse of another color, but even here management has a lot to gain by taking the proper steps with employees and employee organizations to promote attendance by persuasion, reasoning and discipline properly administered.

Labor turnover is another factor in operation to which management, of necessity, has been forced to give more consideration. Nowadays when a man quits there is a question as to whether another can be obtained to take his place. Even where such is possible, many companies have found that the cost of training, growing out of a high labor turnover, is a considerable item of expense. So management has another problem—some would call it a headache—in this field also, although many have found that many of the methods that work in reducing absenteeism also tend to reduce turnover.

Management—and men—today face the toughest job in coal-mining history. They also are on the threshold of their greatest opportunity. In the following pages, Coal Age presents for the benefit of management, men and the coal industry a number of tested methods for more efficient use of mining manpower for greater wartime production and reduced peacetime cost.

# Men on the Job Mean More Coal

While loss of men is the major factor now restricting capacity to produce in coal mining, absenteeism and high labor turnover have hampered the industry since the nation first embarked on its defense program and now are more critical than ever. Losses to the armed services were to be expected but losses to other industries and through drifters, job shoppers and the like were an added blow against which coal could not protect itself and which it received very little assistance from manpower authorities in warding off until recently—and not too much then.

Increasing age of miners has been a factor in absenteeism, as well as a heavier working schedule. But there are others just as big and much less excusable, including the "What the hell" philosophy complicated by more money to spend than at any time in a long period of years. In fact, as the war has ground along and coal demand has increased in the face of a steadily tighter manpower situation, absenteeism also has increased.

The bituminous absence rate in December, 1944, the last month for which figures were available at this writing, was 14.9 percent compared with 12.5 percent in November, 12.4 in October and 8.0 in March, 1943, the first month for which figures were collected by the Bureau of Labor Statistics. In other words, it can be assumed that one-eighth to one-seventh of the available working force was idle due to absence from work in the last quarter of 1944—probably more than half voluntarily or unnecessarily.

Many consider anthracite mining to be even harder

work than bituminous and if that were the case it might be assumed that the hard-coal absence rate would be approximately the same. Actually, the anthracite rate in September, October and November, 1944, was only 6.3 to 7.1, slightly more than the average for 28 selected war industries (6.2 to 6.3). The figures presumably include some voluntary absenteeism and, despite the higher accident rate in the anthracite industry, reinforce the conclusion that there is a high percentage of unnecessary absence among bituminous miners.

The question then becomes one of what should be done and who should do it. The public, governmental authorities and labor organizations have equally much at stake and rightfully should join with management in reducing idle time. Actually, however, it falls to management to do a large part of what can be done.

Organization plus enlistment of cooperation plus safe, comfortable, healthful working conditions plus off-work assistance where possible plus adequate records plus education reinforced by proper discipline and awards for good records are some of the methods which experience has shown reduce absenteeism. Many also have boiled the problem down and put it another way: really sell the miner on the war and what his efforts mean in terms of the welfare of his country now and his own welfare in the future.

It is agreed that whatever is done cannot be done easily. But organized methods, it also is agreed, can get some results, while a reduction of only two or three percentage points in the absence rate would assure a

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## Ten Steps to Better Attendance

Ways and means of reducing absenteeism are as numerous as the man struggling with the problem. Many, however, are in substantial agreement that the following is a good start toward its solution.

- 1 ORGANIZE.** While it need not, in many cases, go to elaborate lengths, management must organize and plan to promote attendance the same as it does to achieve any other objective.
  - 2 GET THE FACTS.** An accurate record designed for regular review and use is essential to the success of any program looking to a reduction in absenteeism.
  - 3 KNOW THE CAUSES.** All absences should be explained either orally or in writing by the absentee upon his return to work. Every attempt should be made to get at the real reason, which frequently is not the stated one, for the guidance of management.
  - 4 EXPLAIN THE PROGRAM.** Better results normally are obtained when the reasons for reducing absenteeism and how it is to be done are fully understood by both management and men.
  - 5 ENLIST COOPERATION.** Active assistance from representatives of employees usually is listed as a
-



much closer approach to meeting expected demands for coal for essential civilian and military purposes or the remainder of the war. A cut of one percentage point in the bituminous rate, for example, could provide over 1,000,000 more man-days of work in 1945, equivalent to approximately 6,000,000 tons of production. In anthracite, a similar saving would be equivalent to over 500,000 tons more coal in 1945. Additional benefits would result from smoother functioning of production crews less disrupted by absences of key or other essential men.

High labor turnover, while not as much of a handicap as excessive absenteeism, nevertheless is a substantial burden on effective utilization of manpower, especially in these critical days. It disrupts crews and production processes through the loss of key men and the slowing up that is inevitable while a green hand is being trained or learning the ropes—provided such a green hand can be recruited.

A low labor turnover is accepted as highly desirable even in normal times because it costs money to put a man on the payroll and train him or break him in while paying him regular wages, as often is the case, for a reduced output. So it behooves employers to retain, if at all possible, the experienced, capable men already on the job, even though military demands have materially interfered with normal procedure.

Since turnover is another phase of mining involving human attitudes and relations, its alleviation again is easier talked about than accomplished. Fundamentally, of course, if a man is satisfied with his pay, with his working and living conditions and with his boss, assuming he is the right man for the job, he will be more inclined to stick. Upon these considerations, then, management can build to hold him and his buddies. Good

#### WHAT ABSENCE REDUCTION MEANS IN TONNAGE

	Cutting absence rate	Increases man-days available for work	And raises annual producing capacity
BIT.	2%	2,128,000	11,916,000
	4%	4,256,000	23,833,600
	6%	6,484,000	35,750,400
ANTH.	1%	210,000	588,000
	2%	420,000	1,176,000
	3%	630,000	1,764,000

working conditions, good living conditions (as far as they are in the control of management), fair treatment and a boss who is a boss and consequently knows his business are among the fundamentals to be considered in reducing labor turnover.

The right introduction to his job also is ranked high as a turnover reducer by management authorities. This includes both the introduction proper and any ensuing or supplementary training or breaking in that may be necessary. But if, in spite of everything, a man serves notice that he is departing, there still is a good chance of changing his mind by what the professors call the "exit interview" but what might be called in mining "getting it off his chest." Properly conducted, the final talk with a would-be ex-employee often can be used to return him to work really intent on staying.

major help in promoting attendance.

- 6 **DISCIPLINE, WHEN NECESSARY.** according to the rules. Any program for control of absenteeism should have teeth in it and those teeth should be used when necessary.
- 7 **IMPROVE WORKING CONDITIONS.** Making working conditions as comfortable, healthful and safe as possible reduces absenteeism due to injuries, sickness and fatigue, and also tends to alleviate voluntary and semi-voluntary absences.
- 8 **OFF-WORK ASSISTANCE.** Aid in eliminating off-the-job causes of absenteeism through such means as cashing checks, facilitating ~~issue of rations and the like~~ has been found very effective where it can be offered as a means of reducing voluntary and semi-voluntary absenteeism.
- 9 **ENCOURAGE SAVING AND GOOD BUYING.** Helping employees save and providing, as far as possible, opportunities for spending their increased earnings for things which really benefit them and their families are among the suggestions offered for eliminating one of the big causes of absence.
- 10 **REWARD GOOD RECORDS.** Concentrating on praise and tangible awards for "attendanceism" rather than on penalties and castigation for "absenteeism" has proved highly effective at a number of coal-mining operations.

# Machine Methods Raise Efficiency

MACHINES ARE THE BIG ANSWER to better utilization of mining manpower but not the only one. Methods and managerial and supervisory quality also play a part and the savings in manpower and cost often may be substantial. Not only should every auxiliary operation be studied to see if it is holding up loaders or loading machines at the face and thereby restricting full utilization of manpower but the general mining plan should be examined to see if it is involving a waste of manpower that if eliminated would not only help the war effort but make possible the lowest possible cost in the future. Some major roads to the desired results are summarized in the following.

## More Machinery—Better Manpower Usage

A man with a shovel, a breast auger or a pick can do just so much before fatigue puts a stop to his efforts and forces a period of recuperation. Machines, however, do not tire, and within limits can be made strong enough to handle any desired drilling, cutting, digging, lifting and transporting job. The machine, therefore, is the outstanding means of increasing the efficiency of mining manpower and consequently making possible lower costs with good wages.

With experience in the design, application and use of machinery, types and sizes now are available for a wide range of mining conditions. Loading machines, for example, are now offered for coal as low as 30 in.,

while hand-loaded and self-loading conveyors go even farther down.

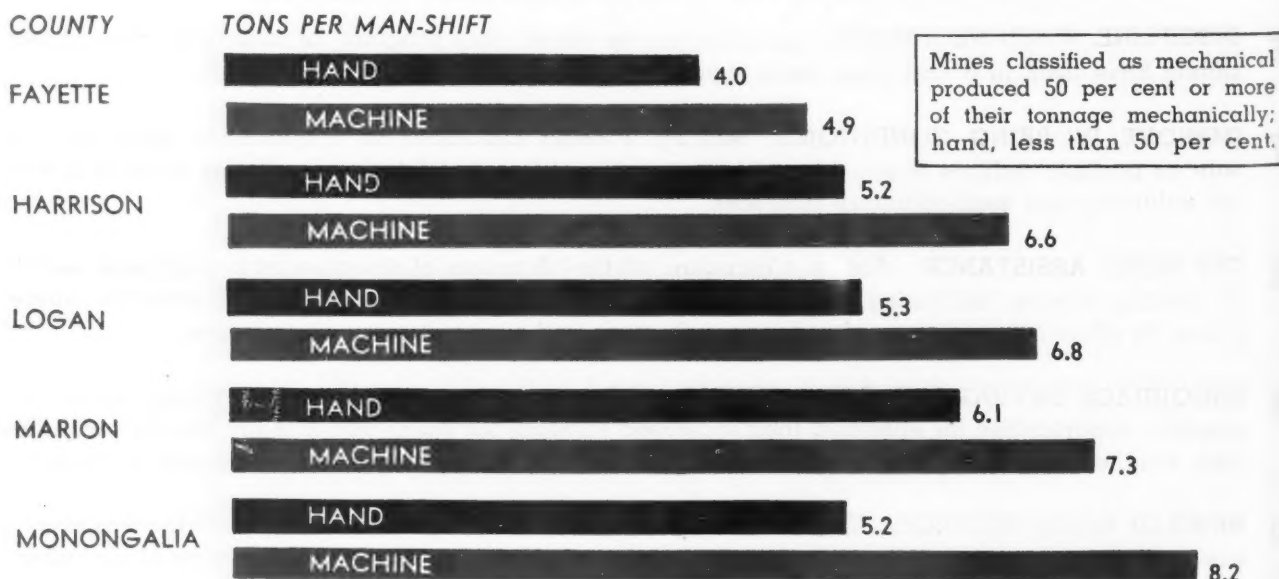
The question is: "What does this investment mean in production per man?" Judging from available statistical data, mechanical-mining equipment, properly selected, applied and used, normally increases average productivity, all men on the payroll, from 20 to 50 per cent and up, with a corresponding cost reduction. In five selected counties in West Virginia, for example, mines producing half or more of their output mechanically in 1943 reported an average output per man-shift 22½ up to 48 per cent greater than that of mines in the same counties producing less than half their tonnage mechanically. Data for each of the five counties, which range from predominantly conveyor through mixed conveyors and loaders into completely loader equipped, are presented graphically in the accompanying chart. For higher productivity and better utilization of mining manpower, the machine still is the big answer.

## Manpower Reflects Operating Plan

The manner in which a coal mine is projected and operated can have a material long-time influence on manpower needs in addition to its immediate aspects. By the same token, it often is possible to revise an old operating layout, even if it costs some money, and still come out ahead on both counts.

Full-retreat operation, or at least retreat within

## Men Produce More With Machines



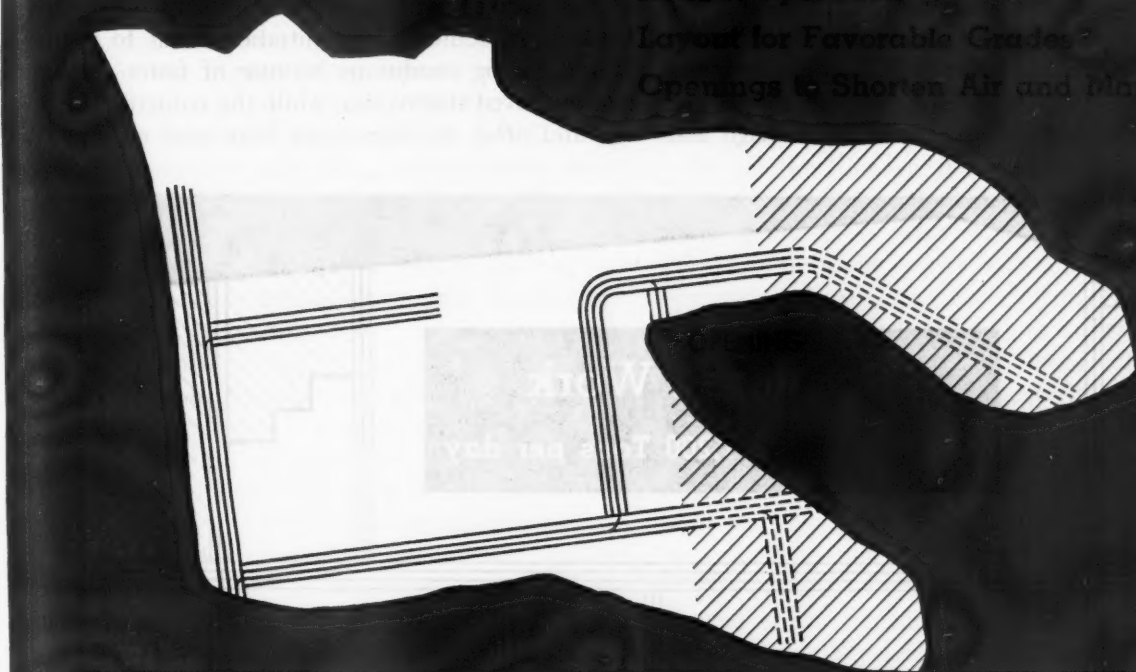
BASED ON DATA IN 1943 REPORT OF WEST VIRGINIA DEPARTMENT OF MINES

## Money and Manpower Savers

Retreat Operation

Layout for Favorable Grades

Openings to Shorten Air and Man Travel



sections, has long been accepted as most economical of manpower and consequently lowest in cost. Keeping entries open and maintaining ventilation, drainage and other services between gobs or through large areas of standing pillars almost inevitably results in higher labor for maintenance of entries and maintenance and operation of the facilities in such openings.

In full retreat, all openings are in virgin coal. The worked-out sections, where the majority of the troubles involving manpower and materials originate, can be left behind with little further attention. With modern entry-driving methods and equipment, driving to the boundary or to the back of the property is fast and relatively cheap, while cost reductions of as much as 10 percent or more over the life of the property are cited by those who follow the full-retreat plan.

The location of the preparation plant and of openings for men and materials also can help or handicap a property over its full or remaining life. Pulling coal and pumping water upgrade requires more men, and the eventual cost of their wages and the extra equipment and facilities required may be several times the extra cost of putting the plant in a location a little more difficult of access on the surface but ideally situated from the standpoint of underground work. The same considerations also may warrant a move from a known high-cost location. When one man's wages, plus extra power and investment in equipment for haulage, as an example, can run to \$2,500 to \$3,000 or more a year for 20 years or more, a moderate addition to initial outlay is worth investigating.

Since 1943, coal has been presented with still another possibility for conserving manpower, although it is not feasible for all mines. The possibility is inherent in the present portal-to-portal set-up. Since time underground is supposed to be spent either traveling or working, except for lunch, the less the travel time the better the utilization of mining manpower and the lower the cost. If a mine employing 100 men underground, for example, could cut travel time from 45 to 15 minutes per shift, it would gain the equivalent of 50 productive hours. On this basis, the extra money for traveling might be \$10,000 a year or more—worth a fair outlay to reduce.

### Concentration Increases Productivity

Spreading working places all over the countryside has long been read out of court in coal mining but evidence indicates that there still is room for improvement in many instances. Concentration is the answer. Working 10 or 20 men in an isolated section means that in effect that section is a separate small mine with its own main line, its own haulage and its own services of all other categories, all using manpower, materials and equipment that would be partly or entirely unnecessary if these 10 or 20 men were in the same territory with the remainder of the mine force. One motorman, plus the necessary cars, track and other equipment, probably would be the minimum extra labor necessary for serving such an isolated territory, and the expenditure would aggregate some thousands of dollars annually.

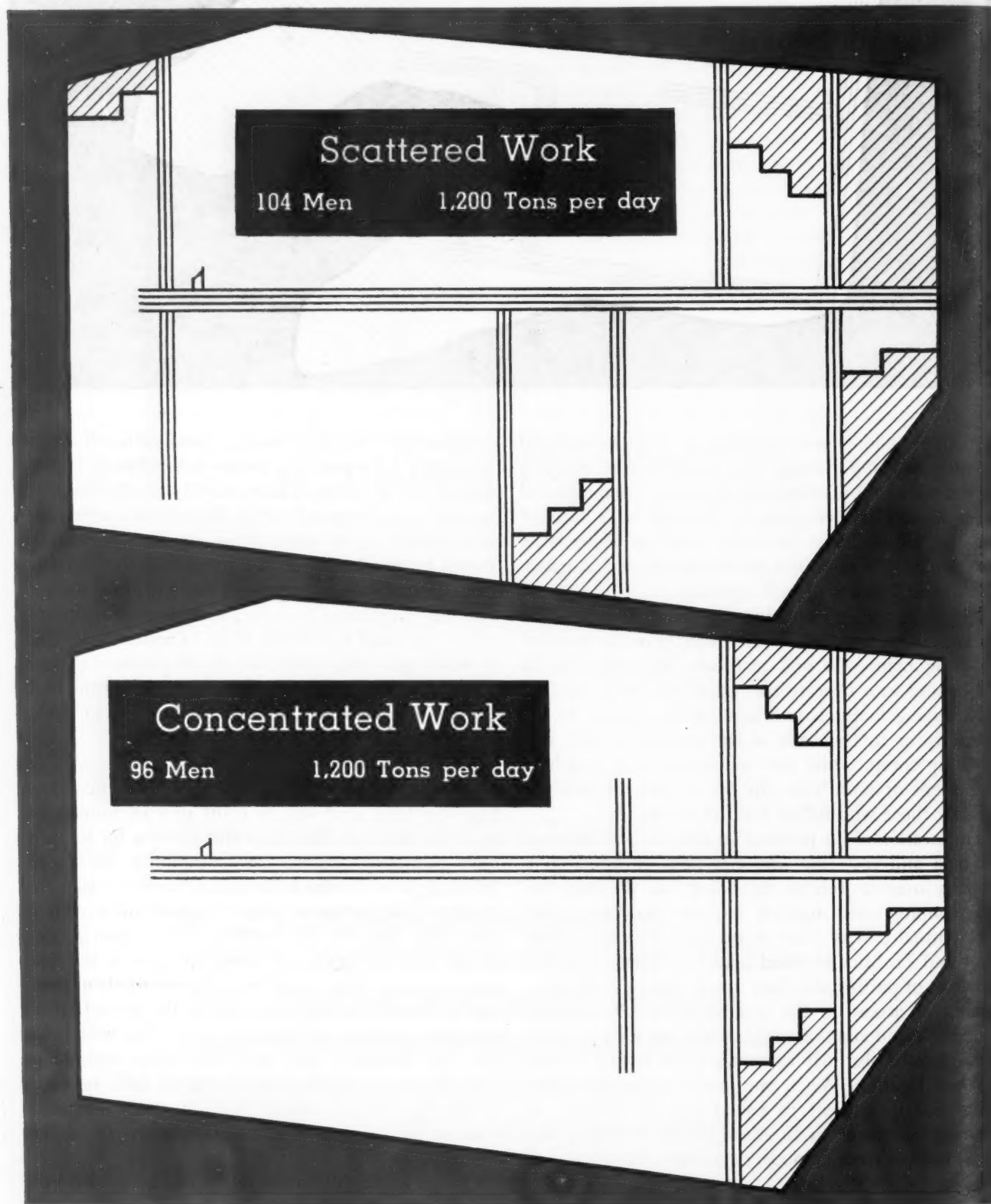
The principles of concentration can be carried even



further to consolidation of two or more mine forces. In fact, there have been several examples of this during the present war involving operations where manpower losses resulted in a substantial reduction of face workers and thus brought about material unbalance because the same or only slightly reduced numbers of haulage and other service workers had to be used. Combining forces permitted better utilization of mining manpower because it provided the normal load for haulage and

other facilities; also because, among other things, the mine selected provided better natural conditions.

The secret of concentration, aside from its doing, is the opportunity for serving the same or a greater number of face workers with fewer haulage and other service workers. In addition, concentration tends to result in better mining conditions because of faster extraction and improved supervision, while the reduction in haulage and other facilities saves labor and reduces cost.



# More Coal, More Tons per Man

INSTALLATION OF MACHINES to replace hand work or of new machines to replace lower-capacity, less-efficient units almost automatically results in better utilization of manpower and lower cost. But it also is a fact that the way a machine is used has a major bearing on its output and the productivity of the men who operate it. In other words, providing the machine—or the hand loader, for that matter—with the best possible opportunity for producing inevitably leads to the desired goals: greater efficiency and lower cost.

Evidence of what real study of mining practices, elimination of bottlenecks and general all-around tightening up can do is supplied in a number of statements submitted in connection with the 1944 "Coal-for-Victory" awards. One operation, which has been using loading machines and big cars for some years, nevertheless was able to increase its output per man-shift 25.3 percent in 1944 as compared with 1943, or considerably in excess of any improvement that might have been expected from a longer working shift. As another example, a conveyor operation raised productivity per man 16.7 percent chiefly "by increased supervision over all phases of the same mechanized mining methods and equipment." A hand-loading property, reporting an increase of 17.8 percent, ascribed it to "closer supervision at the working face; working miners single wherever possible; scheduled main-line haulage; improved track; one additional power unit (150-kw.)." Another property reported "fewer accidents, better management, concen-

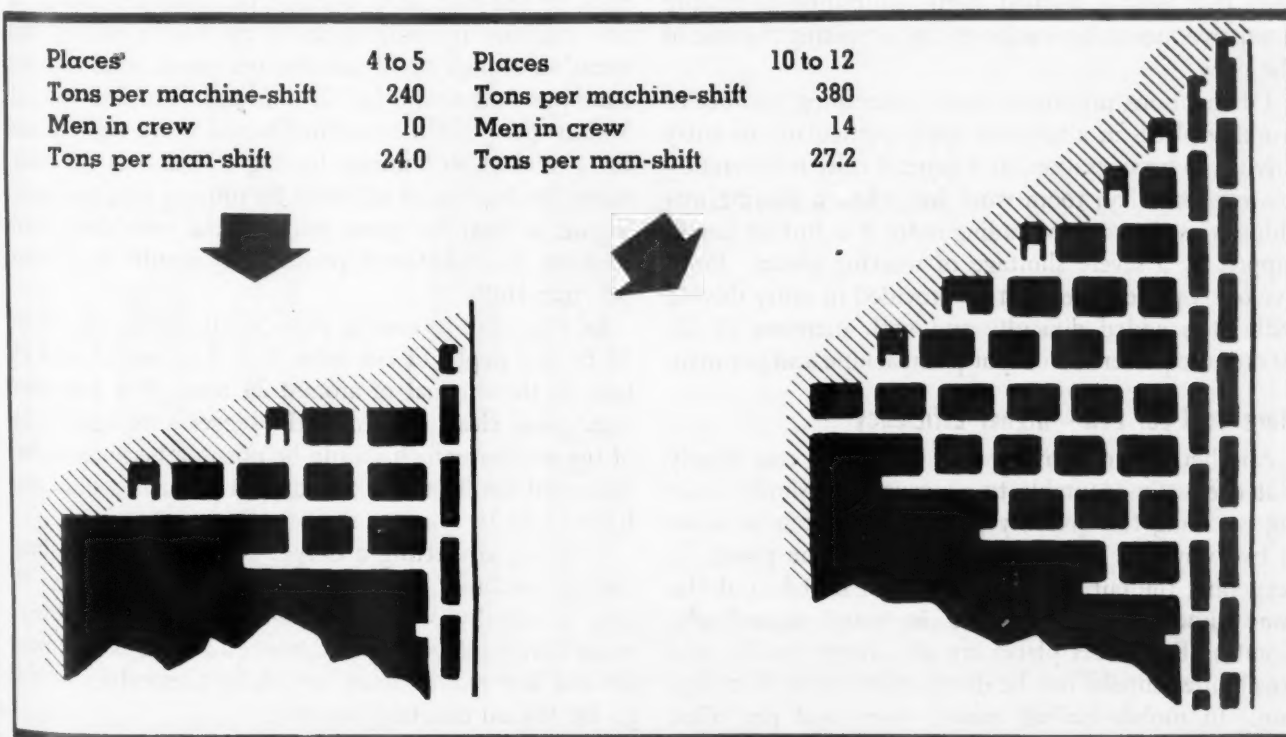
tration" as the major factors in a rise of 18.9 percent in tons per man-shift.

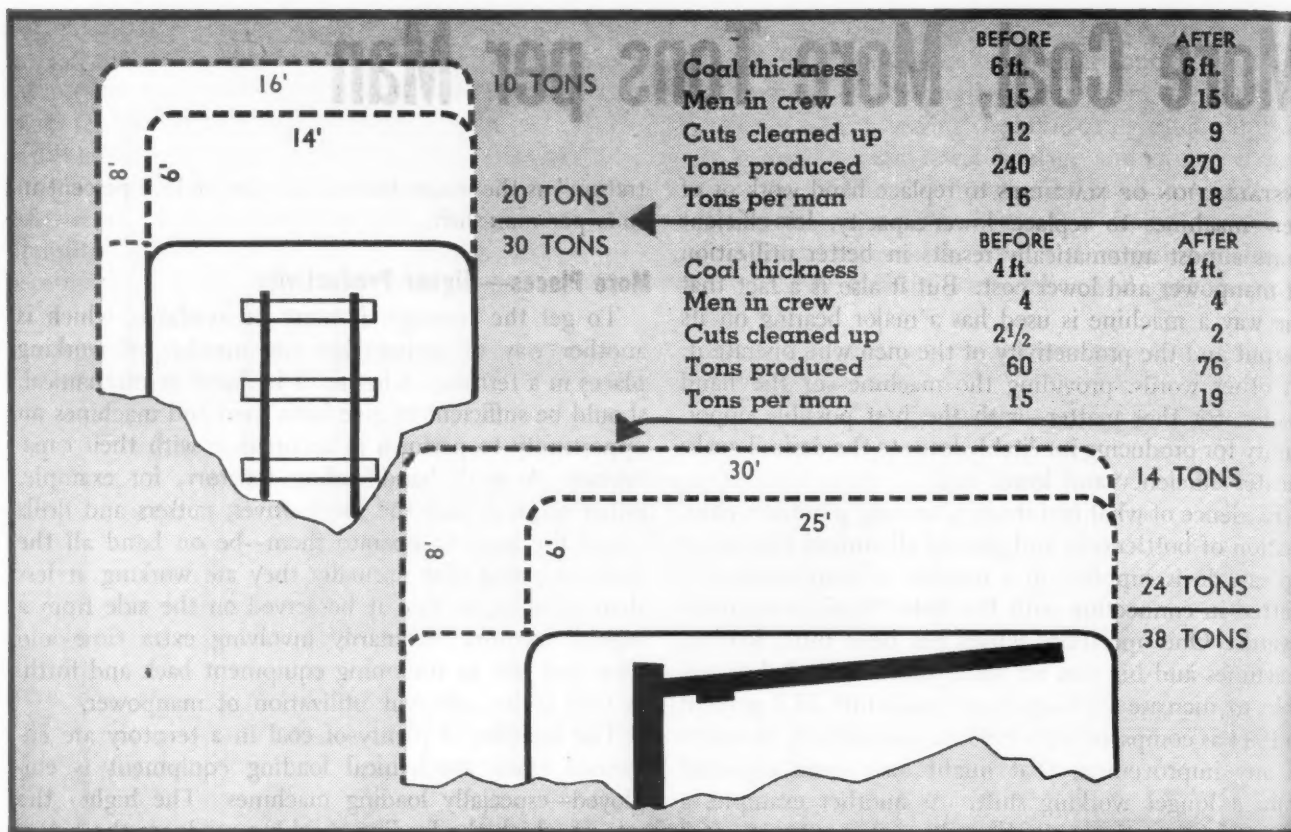
## More Places—Higher Productivity

To get the tonnage, it must be available, which is another way of saying that the number of working places in a territory, whether it be hand or mechanical, should be sufficient to give both men and machines an opportunity to perform in accordance with their capabilities. A small hand-loading territory, for example, either requires that the locomotives, cutters and drills—and the men to operate them—be on hand all the time, meaning that normally they are working at less than capacity, or that it be served on the side from a regular territory, ordinarily involving extra time and wear and tear in tramping equipment back and forth, as well as less efficient utilization of manpower.

The benefits of plenty of coal in a territory are enhanced when mechanical loading equipment is employed—especially loading machines. The higher the rate at which the loading machine produces the better as a general rule is the productivity of the crew in addition to the fact that better utilization of the investment also is assured. The test is output per man on the crew. For instance, a loader might be averaging 240 tons with a crew of ten men in four to five places. If the number of places were increased from ten to twelve, thus eliminating waiting and interference, it might be possible to get 380 tons per shift with 14 men.

Places*	4 to 5	Places	10 to 12
Tons per machine-shift	240	Tons per machine-shift	380
Men in crew	10	Men in crew	14
Tons per man-shift	24.0	Tons per man-shift	27.2





Comparative productivity, therefore, would be 24.0 and 27.2 tons.

Under conditions prevailing in coal mines, however, there normally is a limit beyond which crew size cannot be increased without decreasing individual productivity because, with just so many steps in a cycle and so many items of equipment to be operated, there is insufficient work ultimately for the extra men. But until that limit is reached, better utilization of mining manpower normally is achieved by increasing the size of the crew.

Observations previously made concerning number of working places in a territory apply particularly to entry driving. This operation, as a general rule, is inherently less efficient than room work but when a loading machine is used in a two-heading entry it is further handicapped by a severe shortage of working places. Four, five or six places often can be provided in entry driving with little added difficulty and with increases of 25, 50 or more percent in output per machine and per man.

### More Coal per Fall—Higher Efficiency

Another very effective way of increasing coal supply that is equally adaptable to conveyor and similar mining is raising the quantity per fall. This can be done in two ways: (1) increasing the width of the place; (2) deepening the cut. If both steps can be taken at the same time, the benefits are increased accordingly. Granting that wider places are not always feasible, the possibilities should not be dismissed without investigation. In mobile-loading mines, more coal per place

decreases loader moving, or deadheading, time. In conveyor operations, the increased coal per fall reduces the number of interruptions inherent in cutting, drilling, moving of conveyors, extension of timbering and other necessary work, with consequent benefit to loading.

In 6-ft. coal, increasing place width from 14 to 16 ft. and cut depth from 6 to 8 ft. means approximately 10 tons more in a place that originally made about 20 tons, or one-half more tonnage per machine move. If the machine normally cleaned up twelve places and spent an average of 10 minutes per move, total moving time per shift would be 120 minutes. For 240 tons at 30 tons per place the machine would move eight times for a total of 80 minutes, leaving 40 minutes for additional production, or sufficient for moving into and loading out at least one more place. If the crew comprised 15 men, the additional productivity would be 2 tons per man-shift.

In 4-ft. coal, increasing place width from, say, 25 to 30 ft. and depth of cut from 6 to 8 ft. would add 14 tons to the original of around 24 tons. If a four-man crew could clean up two of the bigger cuts, against 2½ of the smaller, which should be possible because of the decreased deadwork per cut, output per man would rise from 15 to 19 tons per shift.

One way of getting a deeper cut is to refit existing cutting machines, where possible, with longer bars. It may be equally or more desirable to buy new equipment that would supply additional advantages in capacity and low maintenance, which in themselves would go far toward offsetting its cost.

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# Face Preparation for Efficiency

ONE OF THE ACTIVITIES supporting and affecting loading is face preparation. In addition to its influence on the efficiency of the loading operation, face preparation involves labor of its own and consequently offers its own opportunities for better utilization of mining manpower and reduction of cost.

The effect of face-preparation equipment and practices on loading performance can be substantial. If poor cutting, drilling and shooting forces extra digging, both hand loaders and loading machines are handicapped in their main job. Loss of time that might be used in loading an extra 25-ton cut would mean, with a 15-man loading-machine crew, a reduction of 1.67 tons in possible output per man-shift. Corresponding losses would result if hand loaders onto conveyors had to do much digging as a result of poor face preparation.

## Capacity Balance Conserves Manpower

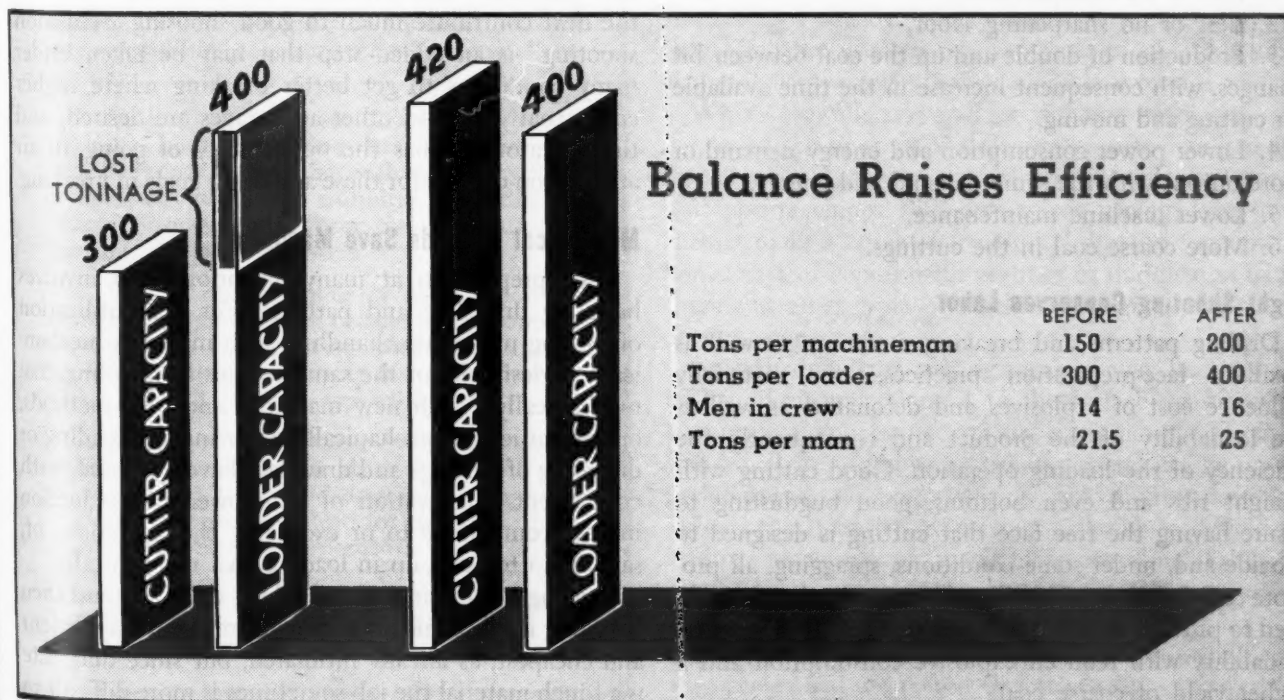
A cutting machine without sufficient capacity to provide all the coal a loading machine can handle can be a severe handicap in attaining maximum manpower utilization. If loader capacity is in excess of cutter capacity, either the loader is held back or extra cutting equipment and men must be employed. Consideration of this point leads directly into the question of balance between the various machines making up a mechanical-mining unit, as well as in the various steps in the mechanical-loading cycle. If a loader can put out 400 tons in a shift and the cutter can provide only 300, the result almost invariably is a reduction in possible output per man and higher cost. Balancing equipment

capacity often warrants a substantial outlay of money, which, however, is soon returned in lower cost of coal.

Balancing, as previously implied, ordinarily means the purchase of higher-capacity equipment. Since this equipment usually can be operated by the same number of men, the result inevitably is better utilization of mining manpower. In addition to higher capacity or other special features promoting efficiency in operation, new equipment normally is more economical of power and can be maintained with fewer man-hours, again conserving labor. Machines of the universal cutting and shearing type also make possible better shooting at a lower cost while tending to increase loadability and thus favoring the most critical of all operations—loading. Special controls and auxiliaries, including equipment for handling bugdust, are added manpower savers now available on cutting equipment. Double or more the capacity per unit as compared with equipment available only a few years ago is reflected in increasing installation of modern machines, including drilling units, which often return their extra cost in two to three years—sometimes less.

## Modern Bits Boost Productivity

Regardless of machine type and other features, however, cutting and drilling eventually boil down to the fact that the machine can act only through the cutting edges of the bits. Bit design, metal, tipping and positioning therefore become outstanding matters of importance and consequently exert a major influence on the utilization of cutting manpower as well as on cutting



## Treated Bits—More Tons per Man



UNTREATED BITS — 10 Places, 320 Tons



TREATED or SPECIAL BITS — 12 Places, 384 Tons

cost. If two out of three bit changes taking, say, five minutes each, could be eliminated, the extra time for cutting in a shift might aggregate 30 minutes to an hour or more, thus providing a chance to cut one to three more places with the same crew.

Steps that can be taken to conserve manpower where bits are concerned include:

1. Use of alloy bits with special cutting tips.
2. Tipping with a hard-surfacing material.
3. Heat-treating.
4. Use of special alloy bits, including multiple-point types.

Advantages include the following:

1. Less or no transportation.
2. Less or no sharpening labor.
3. Production of double and up the coal between bit changes, with consequent increase in the time available for cutting and moving.
4. Lower power consumption and energy demand or more output with the same demand and energy.
5. Lower machine maintenance.
6. More coarse coal in the cuttings.

### Right Shooting Conserves Labor

Drilling patterns and breaking mediums, as well as auxiliary face-preparation practices, can materially influence cost of explosives and detonators as well as the loadability of the product and consequently the efficiency of the loading operation. Good cutting with straight ribs and even bottoms, good bugdusting to insure having the free face that cutting is designed to provide and, under some conditions, spragging, all promote efficiency in shooting. Shearing is increasingly used to provide an additional free face and thus increase loadability with reduced explosive consumption and a higher yield of coarse coal.

Number and location of drillholes and type of breaking medium are a matter of study for each individual operation. But while no general rules can be laid down, hole pattern and breaking medium repay careful study by providing better loadability (10 percent or greater loader outputs are reported at many operations) and a reduction of as much as 50 percent or more in the cost of explosives and detonators. Study of the hole pattern often will show how the job can be done with the same or fewer drill set-ups even though additional holes may be found to provide better breaking. Equal burden on each hole with balance from back to front and from top to bottom (to prevent shooting out at the back or into the shear) and provisions for one hole to relieve the next contribute much to good shooting. "Cushion shooting" is an added step that may be taken under many conditions to get better breaking where higher coarse-coal yield and other advantages are desired, and the operator also has the opportunity of going to air and carbon-dioxide for these and other goals in breaking.

### Mechanical Methods Save Manpower

Face preparation at many operations also involves handling drawslate and partings. For best utilization of mining manpower, handling such materials mechanically is desirable for the same reasons as handling coal mechanically. With new machines and new methods, opportunities for mechanically removing and loading or disposing of partings and drawslate have increased, with consequent conservation of manpower and reduction in cost comparable to or exceeding the reductions of, say, 25c. a ton and up in loading coal mechanically.

Cutting out or cutting and raking drawslate and then handling it mechanically normally are the most efficient and cheapest, as already intimated, but since drawslate is a tough material the job sometimes is more difficult to



## Good Shooting—Increased Productivity—Lower Cost

### OUTPUT PER LOADING UNIT



### COST OF EXPLOSIVES AND SUPPLIES



accomplish than state. However, machines have been developed for cutting and loading this material in one operation and with the improvement in bits now under way the possibilities are growing. When equipment for top cutting is available, it also is possible to cut under the drawslate and shoot it preparatory to putting it off the coal for disposal, although this procedure necessarily entails some additional labor.

Holding the slate by posts, jacks and forepoles until the coal can be loaded (where the equipment has a reach

sufficient so that men need not go back under the slate) is a popular and effective method of coping with the problem. After the coal is loaded, the drawslate is dropped or shot down for loading or other disposal.

Disposal in the place, provided space, equipment and mining method permit, ordinarily is cheapest in manpower and money. Throwing it back of the conveyor on the side opposite where pillaring is to take place (if done) is one disposal method where this type of equipment is employed. When loading machines are used, it often is possible to turn the rear conveyor and gob along one or both ribs, depending upon whether or not pillars are recovered. To save handling the entire drawslate burden, some operators use the face-and-wing system, based on two or three cuts in the face with removal of the drawslate followed by slabbing on one side or both, leaving up the slate over the slab cuts, which eliminates handling it. The space provided by the slab cuts is used for gobbing the slate from the face, either by hand or machine, which saves loading it and taking it outside. Where shuttle cars are employed, they often are used to receive the slate and then discharge it back along the rib and/or in crosscuts.

Where arcwall, universal or slabbing machines are employed, partings or middlemen can be handled in several ways. Lately, manufacturers are offering short-wall-type machines with cutter bars arranged for top cutting or in a range of locations from the top down. Some ways of coping with partings or middlemen with these and other types of machines are given elsewhere on this page.

As with drawslate, parting material may be handled by loading it and taking it to the surface for disposal. Best utilization of manpower and equipment and lowest cost usually result, however, when disposal can be made underground, although this is not always possible. Where the quantity of parting material is sufficient, loading machines or mechanical handling facilities should be employed as far as possible. Where shuttle cars are used, even greater opportunity is provided for disposal underground since the cars can go into almost any opening and can unload themselves.

### Handling Partings With Fewer Men

1. Cutting out when thin.
2. Cutting once or twice and then raking when thick and handling mechanically.
3. Cutting under, shooting down, pulling out and handling mechanically.
4. Cutting under, shooting and loading bottom bench, dropping or shooting parting and handling mechanically to clear top bench.
5. Cutting over, where the loader has a high-lift head, shooting and loading top bench, removing parting with loader (with or without shooting) and gobbing or loading it, completing the operation by shooting and loading the bottom bench.
6. Where undercutting is done, shooting and loading the bottom bench, then dropping or shooting the parting and handling it mechanically, completing the operation by shooting and loading top coal.
7. Shooting and loading everything in the seam or shooting the drawslate with the coal, loading it all and depending upon the surface preparation plant for removal of the impurities. Several operators have found that this is the cheapest in the long run, although each case must be studied individually and a site for the refuse and the added cost of disposal must be considered.



# Service for Loader Productivity

How EFFICIENTLY the transportation system operates in taking coal away has a material bearing on how much a loader, hand or machine, can produce and consequently on cost and manpower utilization. As evidence of its importance, transportation, under the designation of "turn," always has been a matter of discussion and sometimes a bone of contention in hand-loading operations. Not infrequently, in the old days, operators were prone to let the loader wait and thus put on him the responsibility for making up for poor track, inefficient methods and too few cars and locomotives. But now, when coal is badly needed and chances for profit are better, the goal should be a car at hand as soon as one is loaded. Loaders thereby would be enabled to produce more, provided size of cut was adjusted when necessary, with consequent improvement in their earnings and in manpower utilization.

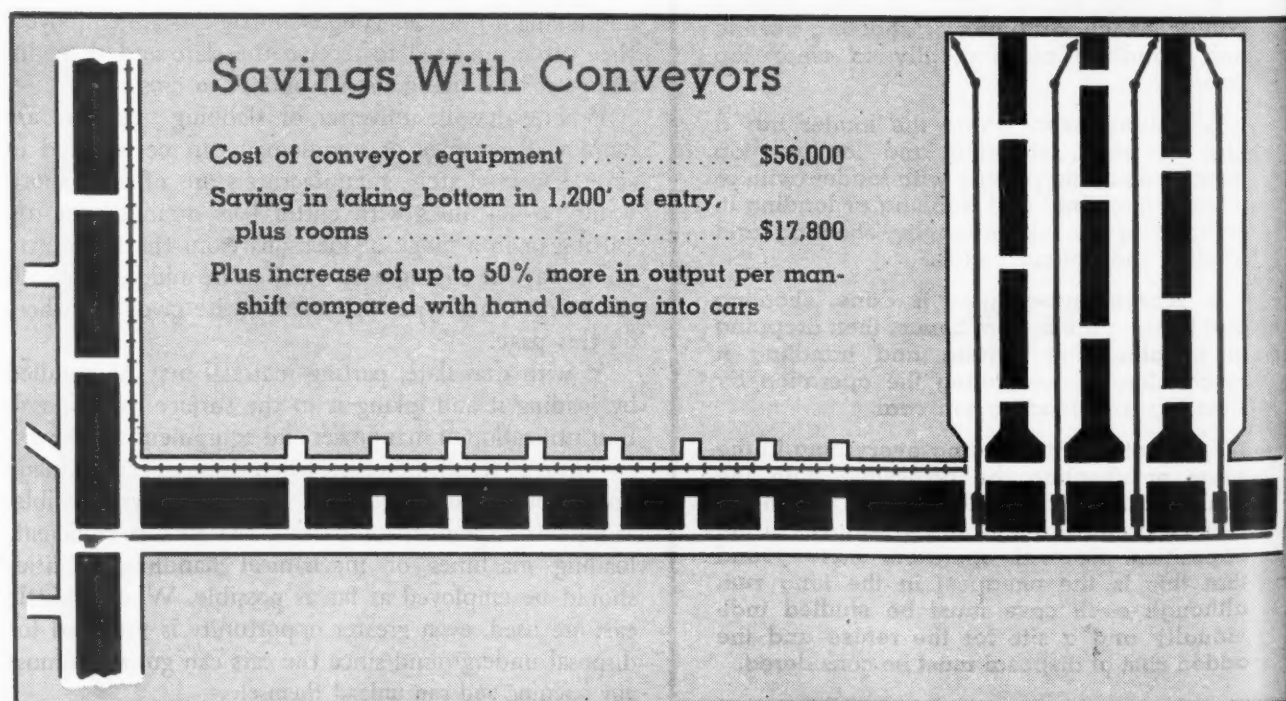
## Conveyors Conserve Labor

Transportation, in the long run, is the key to maximum productivity at the face, especially where mobile loading machines are employed. The available mediums include mine cars and track, rubber-tired units and conveyors, plus other equipment of more special or limited use. Theoretically, the goal is a medium that operates continuously and always is available. The conveyor, more than anything else, meets these tests and consequently has been installed in increasing numbers, especially in the thinner seams, for room and room and entry work and, on occasions, for all transportation.

Continuity of transportation is not the only advantage possessed by conveyors. The shaking type may be equipped with self-loading heads and thus combine mechanical loading with the initial phase of transportation. One of the major advantages in conveyors, however, is elimination of the necessity for taking top or bottom for mine cars or other equipment. Such work runs into real money and it often is possible to save in not over four or five installations the cost of the conveying equipment in rock handling alone, in addition to reduced power consumption and power peaks and higher output per man at the face through greater continuity in transportation. Eliminating rock handling, in addition to cutting cost, also results in substantial manpower conservation even after labor for moving and setting up is subtracted. Even this moving cost is being reduced by making drives self-propelling, one operation pioneering in this development reporting productivity of 20 tons per face man per shift and 12.96 for all employees in 42-in. coal (January Coal Age, p. 92). The cost and labor of track also is eliminated, although a number of operations are finding that a supply track paralleling the conveyor results in a saving in manpower in handling supplies. Such tracks, however, do not represent the investment in materials and labor that regular track does.

## Big Cars—Better Manpower Use

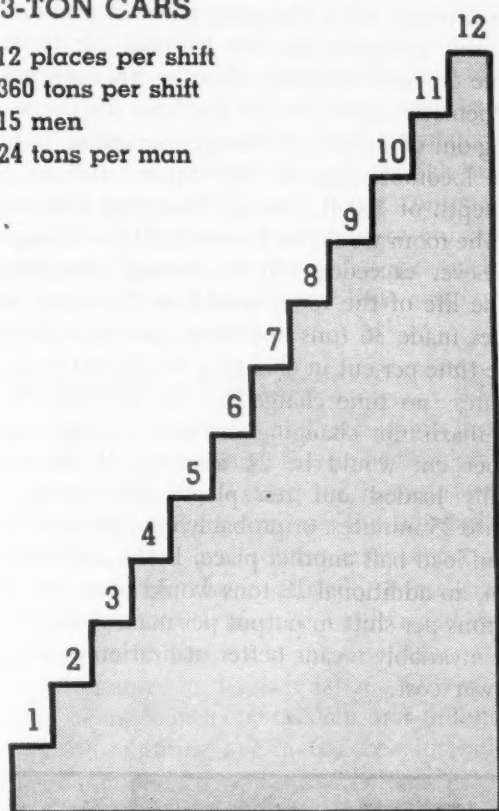
While the field of the conveyor is yet to be fully explored, wheeled equipment still rules the roost when



## Bigger Cars—Higher Efficiency

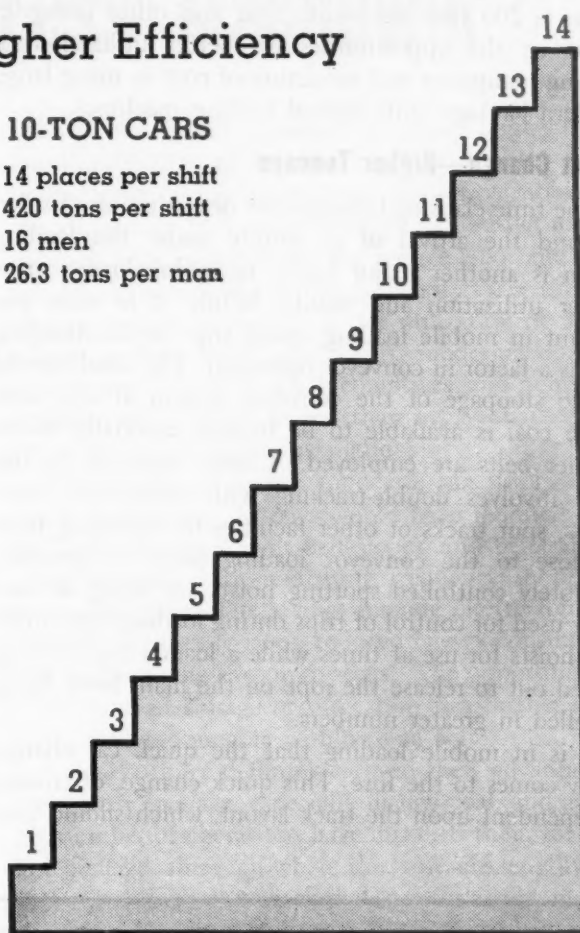
### 3-TON CARS

12 places per shift  
360 tons per shift  
15 men  
24 tons per man



### 10-TON CARS

14 places per shift  
420 tons per shift  
16 men  
26.3 tons per man



the coal begins to thicken and loading machines may be employed. In fact, most conveyors and conveyor systems usually terminate in mine-car loading points because the big mine car and locomotive still lead the field in main-line transportation as well as in service to loading machines, although the belt is offering a growing challenge in main-line service.

Where mine cars are used, their size is directly reflected in the performance of the loading machine and the productivity of the crew on that loading unit. This act cannot be emphasized too strongly, as experience has demonstrated over and over that the cost of a 6- to 10-ton or larger car usually can be saved in less than a year through not only increased output per man-shift as compared with using 2- to 3-ton equipment but in haulage and maintenance labor and materials.

The possibilities in big cars can be arrived at very quickly by calculating. If places made 30 tons, for example, and average car-changing time was one minute, total changing time for a place with 3-ton cars would be nine minutes (no time charged against last car because loader would move). If 10-ton cars were substituted, total changing time (three cars) would be two minutes, a saving of seven minutes per cut. If the unit originally loaded out twelve places, the saving in a shift would be 84 minutes, or sufficient to move into and load two to

three more places. With no change in the crew of 15, productivity per man would increase from 24 to 28 tons, assuming two extra places loaded; if one man were added to the crew, from 24 to 26.3 tons.

Where small shafts limit the size of car that can be hoisted, numerous operators have adopted large drop-bottom units for use in the sections, these drop-bottom cars transferring their loads to the small cars for hoisting through the medium of transfer stations. In this way these operators have obtained, with a relatively small additional investment in equipment and operating labor, all the important advantages of the big car.

Rubber-tired haulage equipment normally offers the advantages of increased capacity plus the additional advantages inherent in having two changing units and thus shortening the time between changes still further. Shuttle cars in combination with mother belts are finding increased application in mines, especially those operating thinner coal. In connection with a gathering conveyor, they are showing definite results in at least one operation mining a seam with a 10-percent pitch. The cars operate in cross-pitch rooms with the gathering conveyor moving the coal down to a trip-loading station. With a crew of 14 men, the shuttle-car unit was averaging 350 tons, with an increase expected when further experience is gained. With 4-ton cars and places



angled 45 deg. across the dip, the average for the 15-man crews is 200 tons per shift. This and other examples point up the opportunities for better utilization of mining manpower and reduction of cost in using large, modern haulage units behind loading machines.

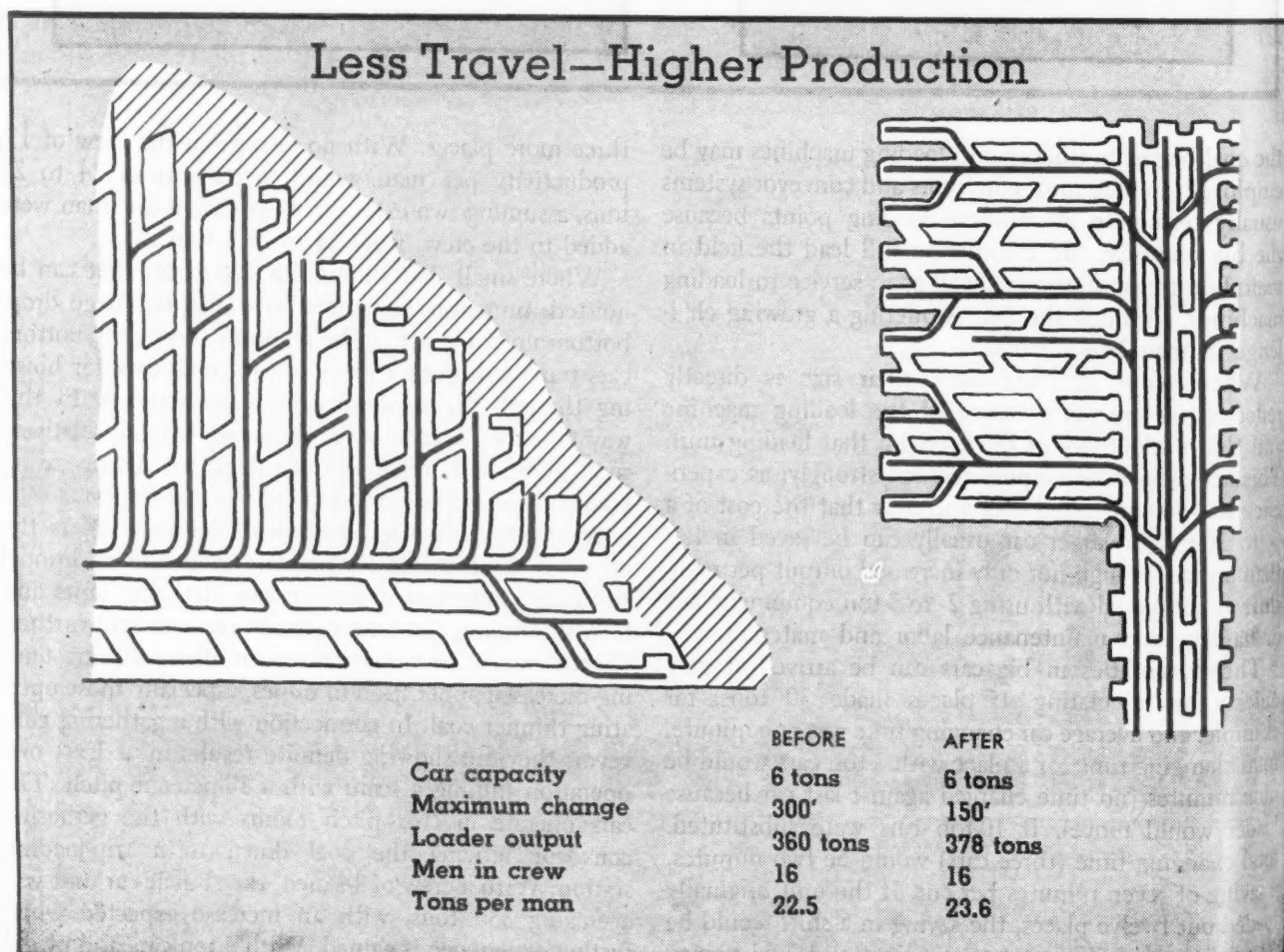
### Short Change—Higher Tonnage

The time elapsing between the departure of a loaded car and the arrival of an empty under the loading boom is another major factor in mobile-loader manpower utilization and results. While it is more important in mobile loading, quick trip- or car-changing also is a factor in conveyor operation. The ideal should be no stoppage of the conveyor system at any time while coal is available to be loaded, especially where mother belts are employed. A close approach to the ideal involves double-tracking with cross-overs, side-tracks, spur tracks or other facilities for changing trips as close to the conveyor loading point as possible. Remotely controlled spotting hoists are being increasingly used for control of trips during loading with auxiliary hoists for use at times while a loaded trip is being pulled out to release the rope on the main hoist being installed in greater numbers.

It is in mobile loading that the quick car change really comes to the fore. This quick change, of course, is dependent upon the track layout, which should pro-

vide a changing point not over 150 ft. from the face at all times, in the opinion of some authorities. A recent development designed to achieve this objective at all times is a complete prefabricated track layout for an entire working panel (January *Coal Age*, p. 89). This system provides for a changing point at every crosscut, which the company justifies by pointing to loading-machine outputs averaging close to 500 tons per shift.

Mathematics again reveals the basis for the increases growing out of a short car change. Assuming a  $3\frac{1}{2}$ -m.p.h. average locomotive speed (300 f.p.m.) and an average room depth of 300 ft., average changing time over the life of the room would be 1 minute. If the changing distance never exceeded 150 ft., average changing time over the life of the room would be  $\frac{1}{2}$  minute per car. If places made 36 tons and 6-ton cars were employed, average time per cut in changing on the entry would be 5 minutes (no time charged to the last car). With a 150-ft. maximum changing distance, average changing time per cut would be  $2\frac{1}{2}$  minutes. If the machine originally loaded out ten places, the saving would aggregate 25 minutes, or probably enough time to move into and load half another place. If the crew comprised 16 men, an additional 18 tons would mean an increase of 1.1 tons per shift in output per man. A short change almost invariably means better utilization of manpower and lower cost.





# Transportation With Less Manpower

MAIN-LINE TRANSPORTATION was one of the earliest mine activities to be mechanized, but that does not signify that all the opportunities for better utilization of mining manpower and reduction in cost have been exhausted. New and better equipment and better materials and constructions still can provide substantial manpower and money savings. It is now being contended that with modern equipment a cost of 4 to 6c. per ton is possible for all transportation from room neck to the surface in high-tonnage mines, this cost including amortization of equipment.

## Modern Equipment—Less Labor

Mine cars, locomotives and conveyors are among the major mediums for main-line and secondary haulage in common use today. Taking the former, larger modern locomotives and cars reduce the number of trips that must be made and consequently the equipment and labor that must be employed. Even the smaller older-type locomotives may be modernized, including the installation of blowers to increase their rating, and thereby economize on haulage labor. Or two locomotives may be made into one tandem unit pulling double the load and requiring one motor crew instead of two.

New or modernized equipment, which now includes dual-duty locomotives with low speed for gathering and high speed for swing or relay work, also saves substantially in maintenance labor and materials. In mine cars, one of the marks of a modern unit is anti-friction bearings, which alone permit a substantial increase in trip

size with the same locomotive and crew. High-strength corrosion-resisting alloys (which reduce total car weight for the same or greater tonnage), spring or rubber suspension, spring draft and buffing gear and other modern materials and constructions also reduce labor and materials for maintenance. Automatic couplers save time and prevent injuries. Through better utilization of mining manpower and other advantages, modernization and new equipment costs for locomotives and mine cars normally are returned in less than five years (less than two years for most car installations).

Where depth of cover is moderate, practically all new mines that in the old days would have required shafts are being equipped with belt slopes, and belts also are being installed with increasing frequency in opening down the pitch. The savings include one to four men per shift in hoisting labor, reduced energy consumption and materially lower power peaks. The opportunity for installation of storage or surge bins is a further advantage readily obtainable with a slope belt.

Belts also have definitely proved their advantages in room-entry haulage, especially in low coal, and a growing number of operations have installed them for main-line haulage, although where the hauls are lengthy most authorities take the view that careful study must be given to each individual case to determine if belts should get the nod over big cars, modern locomotives and modern track. Where belts are used for main-line and secondary haulage with mechanical loading at the face, outputs of as high as 20 to 30 tons per man under-

## Modern Facilities Boost Transportation Efficiency

Small, plain-bearing, wood cars — low-capacity old-style locomotives — hand caging or dumping — high maintenance



Big, high-strength, alloy cars with anti-friction bearings, automatic couplers and other auxiliaries — belt slope, modern hoist or modern dumping facilities — modern high-capacity locomotives — mechanical caging and dumping — low maintenance



ground in 4- to 6-ft. coal have been reported, however. Increasing installation in gangways in pitching coal are evidence that belts offer the possibility of substantial savings in this type of work also.

Caging and dumping mine cars mechanically provides savings equal to or better than those resulting from other mechanical applications, such as loading. Where cars must be coupled, uncoupled and wrestled through the dump and back to the empty track by hand, it is not uncommon to find six to eight men necessary, involving a labor charge of, say, \$8,500 to \$11,000 annually. Proper use of feeders, trip makers and other mechanical facilities should easily cut the manpower required in half and the saving should pay for the installation in little over a year. Use of these facilities plus automatic caging equipment on the bottom accomplishes similar savings in money and more efficient use of manpower at mines operating cage hoists.

### Good Track—Fewer Men

The haulage road, through its influence on the number of haulage units and haulage men that must be employed, materially affects manpower utilization and cost immediately and over the long run in mining. A long and involved route, insufficient or badly located passing tracks, heavy grades and poor track condition can easily mean the use of at least one extra locomotive and crew with consequent increase in cost.

Some characteristics of a good haulage road are:

1. **Short route.** It may be worth while to cut a new opening, build through old works or put in a rock tunnel to cut a half mile or a mile off a haulage road because

the saving of even two men over a period of 20 years or more could amount, on the basis of present wage scales, to over \$50,000, aside from decreased cost of power, track and equipment maintenance and cost of haulage units that otherwise would be needed.

2. **Minimum grades.** As a general rule, increasing from level to a 1-percent grade requires an additional locomotive for the same output; 3-percent grade, two additional locomotives or a correspondingly larger and more costly unit. If the question were solved by cutting down on the size of trips, each with a single locomotive, the number of men would be correspondingly increased. The power peak is boosted and energy use goes up as much as 50 percent or more when grades get up to 3 percent or more. Cutting down humps to 1 percent or less, if possible, frequently may be less than the cost of the extra locomotive equipment and other facilities that must be employed, aside from power and labor savings.

3. **Good roadbed.** A dry, well-constructed base of good, permanent materials is one of the best assurances that track will hold up with a minimum of haulage interruptions and labor for maintenance.

4. **Good track.** Trouble-free track involves heavy rails, joints requiring a minimum or no attention, long-lasting ties, good ballast and curves and super-elevation commensurate with fast operation. One wreck that might have been avoided by good track could conceivably tie up a mine an entire day with the loss of the production of the entire crew for that day. Steel ties at intervals, grouting or concreting switches and similar measures protect track and turnouts and save wreck time.

## Low Cost Accompanies Good Haulways

12c. PER TON

Long route—heavy grades—bad roadbed—  
bad track—bad timbering



7c. PER TON

Short route—grades under 1 percent—  
good roadbed, track and timbering

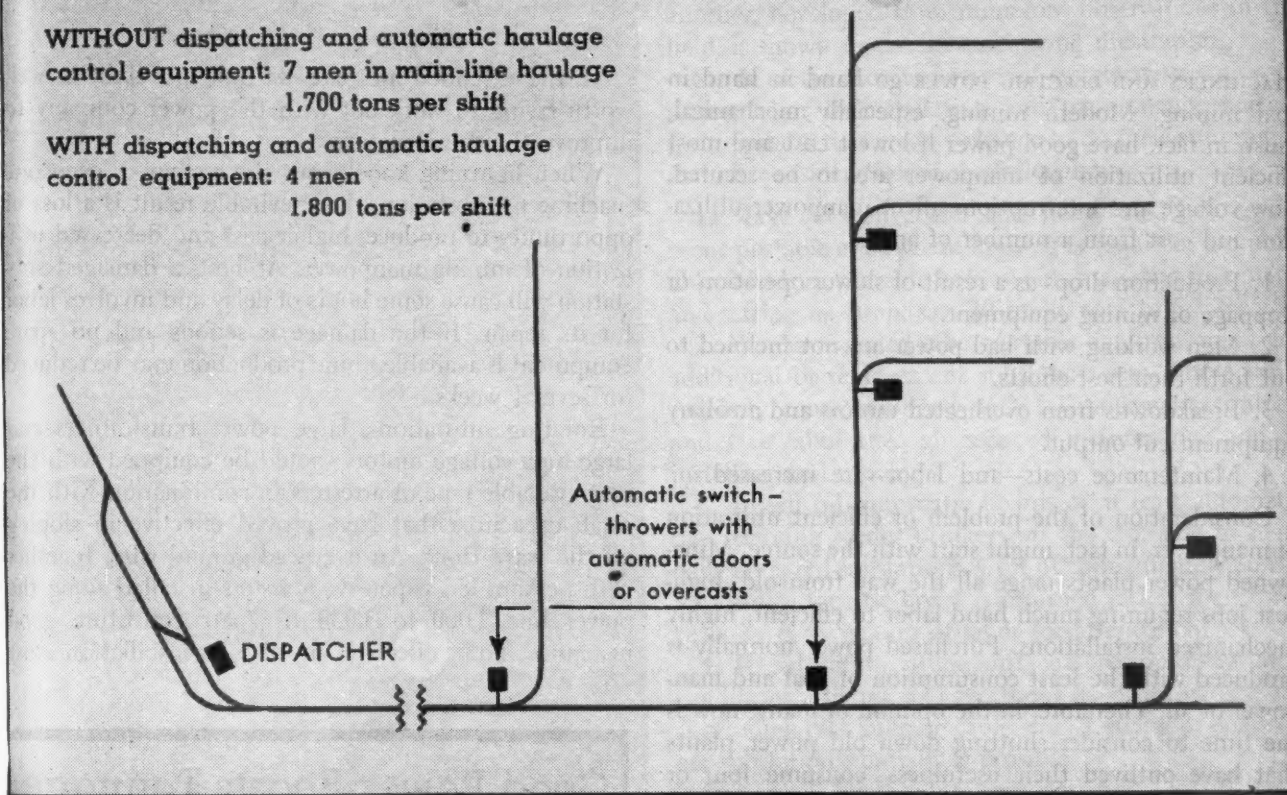




## Modern Controls Provide More Tonnage With Fewer Men

**WITHOUT** dispatching and automatic haulage control equipment: 7 men in main-line haulage  
1,700 tons per shift

**WITH** dispatching and automatic haulage control equipment: 4 men  
1,800 tons per shift



Good track requires a minimum of maintenance, which is nowhere more evident than in tie replacement. Treated ties last 10 years or more, sometimes 20 or 30. Untreated tie life averages in most mines about three years. Assuming 1 man-hour of labor to replace a tie where a stretch of track is torn up and rebuilt, some 3,500 or more additional ties would have to be bought and installed in a 10-year period on a mile of untreated-tie track at a labor cost of over \$3,500 and the expenditure of over 450 man-days of labor. With closer tie spacing and more difficult conditions, the possible savings might run to \$10,000 or more per mile of track in ten years.

In room and room-entry work, the steel or steel-and-wood tie plus steel-tie turnouts cut labor of track installation, and consequently its cost, up to 50 percent or more. Power grading and tamping tools, wrenches, drills, tie choppers (for faster removal of old ties) and similar equipment speed laying of new track and maintenance of old.

6. **Good roof support.** No haulage road can be said to be good until the roof support is on a par with the track and other construction. Methods economical of manpower and money in the long run include use of treated timber, steel timber, hitch drilling to eliminate legs, concreting and guniting. If bad roof should result in delays totaling eight hours a month, the reduction in mine capacity would be approximately 4 percent and up, depending upon the number of days worked.

### Haulage Control—Higher Efficiency

The dispatcher epitomizes control of haulage for best utilization of manpower and lowest cost. At many mines, he is credited with increases of 10 to 20 percent or more in the capacity of the haulage system because he gets the cars to the place where they are needed when they are needed, eliminates interference between haulage units and promotes the smooth flow of traffic. The dispatcher also can materially help management in other respects by keeping his fingers on the pulse of all mining activities and assisting management with information at the time it is most needed. A dispatching system, properly operated, returns its cost manyfold in a year in practically any coal-mining operation.

Besides the dispatcher, a number of mechanical aids are available to management searching for methods of promoting haulage efficiency. Where two or more locomotives use the same stretch of track, block signals operating independently of the dispatcher prevent collisions, unnecessary stops and other interference with trip movement. A simple thing like a switch-position indicator may save many minutes of valuable haulage time by making it unnecessary to slow down or stop to ascertain switch position. If, to prevent stopping trips, a switchthrower were employed, his wages for a year might be \$1,200 or more in normal times. The argument for automatic switchthrowers, as well as for automatic door openers and other automatic equipment, therefore becomes really impressive.



# Power for High Productivity

MACHINERY AND ELECTRIC POWER go hand in hand in coal mining. Modern mining, especially mechanical, must, in fact, have good power if lowest cost and most efficient utilization of manpower are to be secured. Low voltage and interruptions affect manpower utilization and cost from a number of angles.

1. Production drops as a result of slower operation or stoppage of mining equipment.
2. Men working with bad power are not inclined to put forth their best efforts.
3. Breakdowns from overheated motors and auxiliary equipment cut output.
4. Maintenance costs—and labor—are increased.

Consideration of the problem of efficient utilization of manpower, in fact, might start with the source. Mine-owned power plants range all the way from old, high-cost jobs requiring much hand labor to efficient, highly mechanized installations. Purchased power normally is produced with the least consumption of coal and manpower of all. Therefore, in the opinion of many, now is the time to consider shutting down old power plants that have outlived their usefulness, consume four or more times the coal per kilowatt-hour and tie up four to a dozen men in operation and maintenance. If, however, it is necessary to keep such a plant in operation, installation of stokers and full-automatic combustion controls can release one man or more per boiler. Any manual handling of coal or ashes should be carefully studied to see if manpower cannot be conserved and cost reduced by mechanical-handling facilities.

In utilization, some startling savings have been made by fairly simple steps toward improving face voltage and power conditions. In 1944, the production of a relatively new mine operated with mobile loaders, shuttle cars and belts was raised from 1,700 to 2,100 tons per day without hiring more men or installing additional equipment. The difference is largely credited to moving the d.c. conversion equipment about a mile closer to the center of the load. Even higher increases in productivity have been reported by other operations that have really studied distribution problems, while those in the 10 to 20 percent range of improvement are numerous, even considering the fact that they had what might have been considered relatively good conditions to start with.

## A.C. Manpower Savings

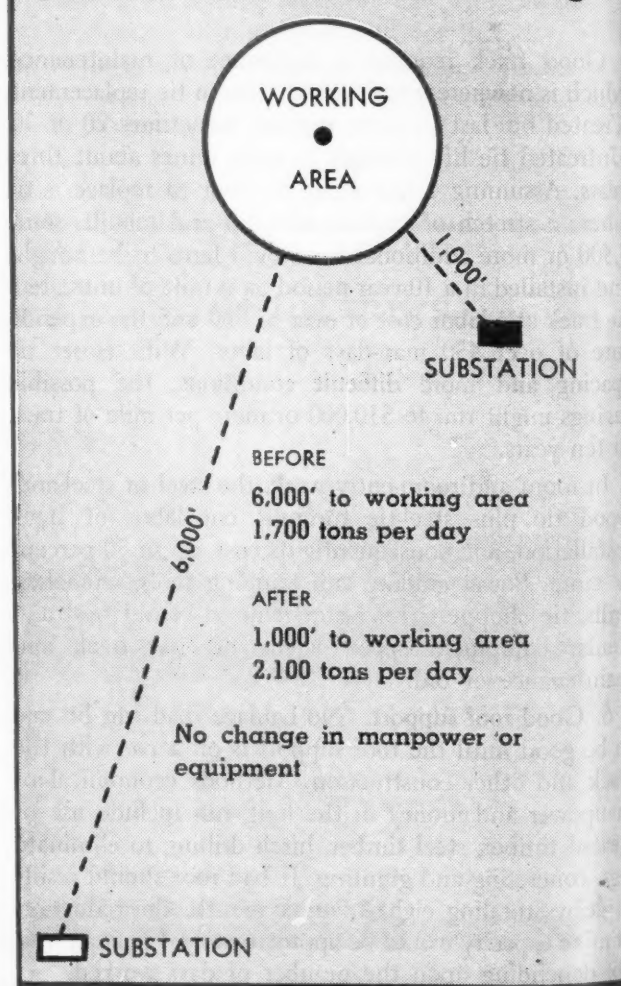
Whether a.c. or d.c. is used at the face, mine power normally starts as a.c., with the main transformer station marking the beginning of the mine's responsibility and opportunities for improving its power situation. Moving this substation to the center of the load, if not already there, or installing a second substation to

serve the extended area are wartime possibilities well worth trying to work out with the power company to improve the mine picture.

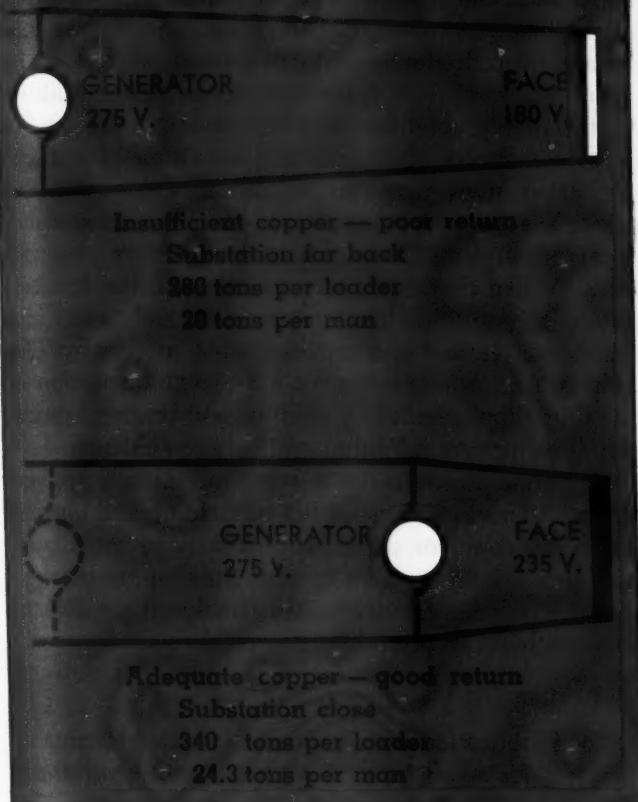
When lightning knocks out the system or even one machine or substation, the inevitable result is a loss of opportunity to produce, higher cost and decreased utilization of mining manpower. At best, a damaged substation will cause some hours of delay and involves labor for its repair. If the damage is serious and no spare equipment is available, mine production may be reduced for several weeks.

Rotating substations, large power transformers and large high-voltage motors should be equipped with the best available type of arresters in combination with the small capacitors that have proved effective in sloping off the wave front. An overhead ground wire, together with perhaps less expensive arresters installed along the power line 2,000 to 3,000 ft. apart constitute good insurance. To be effective, any arrester installation must

## Good Power Boosts Tonnage



## Voltage at the Face Is What Counts



have a reliable low-resistance ground to an earth location always damp or wet.

A.c. systems rather look out for themselves from the standpoint of maintenance of voltage because a.c. motors balk when the voltage drops too low; also, transformer substations usually are easy to move. Putting them on wheels eases moving and conserves manpower.

Transformers filled with non-inflammable liquid for use underground and elsewhere where there is a fire hazard offer possibilities for conserving manpower in addition to the savings resulting from elimination of accidents. Non-inflammable transformers, for example, require no labor and materials for fireproof housings or covers. One 100-percent a.c. conveyor mine has used non-inflammable transformers for six years, simply setting them on the bottom behind a wooden fence, and has never had a dangerous incident.

### D. C. Service for Efficiency

Unlike a.c., d.c. motors keep grinding away on lower and lower voltage until they burn up. For that reason, d.c. service to face equipment is more likely to be neglected, with consequent loss of output and less efficient utilization of manpower. Delay in adding copper, in moving the substation and in providing a good return inevitably result in slowing up of producing

machinery in addition to a let-down on the part of the men operating it. One example of the results of corrective measures was given earlier in this section and another, developed from numerous observations in the field, is shown in the accompanying illustration.

Study of the d.c. underground system with a view to saving labor in installation and maintenance and in giving production crews a chance to do their stuff might include consideration of the following:

1. Make all conversion and heavy auxiliary equipment portable and, where housing is required, use portable shields or portable houses; cuts man-days in moving and setting up from, say, 20 to 30, to 3 to 5.

2. Purchase sealed-tube portable ignitron units for additional or replacement substation sets. These units regularly come equipped with full automatic controls and save labor through reduced maintenance and in installing and moving.

3. Install full-automatic boards or at least automatic d.c. reclosing feeder breakers on the d.c. side of manually operated substations. Cost of approximately \$6,000 for a full-automatic board is returned in less than three years by conservation of labor for attendance.

4. If substation attendants are required by local conditions, arrange to have them do other work, such as grinding bits, splicing cable, etc. A saving of one man per substation normally is possible.

5. Keep 275-volt substations not over 2,500 ft. from the face—preferably not over 1,500. Install sufficient copper and maintain the return so that the voltage at the motor terminals (not at the cable nip) never drops below that on the nameplate. This is Requirement No. 1 for high tonnage per man underground.

6. To reduce manpower required for installing and extending circuits, purchase or arrange for 500,000- and 1,000,000-cir.mil cables in short lengths with permanently attached terminals or connectors.

7. Where heavy locomotives pass close to m.g. stations, install load distributors to prevent interruptions in power supply due to circuit-breaker outages.

8. Sectionalize with quick-break, inclosed safety switches all trolley wire and d.c. feeders every 1,000 ft.; saves time by quickly isolating a faulty circuit.

9. Install automatic reclosing circuit breakers on branch and tie feeders; affords a large saving in production time for units in other sections which otherwise would be stopped by the fault in the section in trouble.

10. In line with making everything portable, put wheels or skids on such auxiliaries as circuit breakers. In one instance, the saving was 5 hours in each moving of a panel breaker.

One operation found that a study of its distribution system permitted combination of certain units and the running of others at only certain hours with a saving of five attendants. Consolidation of battery charging at another, involving a cost of \$75 for rearranging the panels in the central station, saved the equivalent of one man per shift, etc., etc.



# Maintenance to Conserve Manpower

WHEN MACHINES ARE DOWN, so is production and output per man-shift as a general rule. One thing that stops machines is breakdowns. Prevention of these breakdowns and promotion of smooth, trouble-free operation and long life is the function of maintenance. Like many other activities in mining, maintenance affects manpower utilization in other categories and offers opportunities of its own for conservation of labor and consequent reduction in cost.

Not over 1 percent loss of production time due to breakdowns on the job is the goal at many operations using mechanical loaders, or approximately 5 minutes per shift. As compared with, say, an average of 25 minutes—not an unknown figure—the saving in production time is 20 minutes, meaning a chance to load an additional 10 to 20 tons, increasing output per man on the crew at least 1 ton per man-shift with crews of the usual sizes.

## Men, Methods and Records Help

Good organization, good men, system and good materials are the major factors in keeping machines in good operating trim. Good men are the product of training and experience and giving them an opportunity to get that training and experience should be high on the maintenance list. Machine operators and supervisors also play a part in maintenance and should be trained in proper operating methods and what they mean in maintenance, as well as in detecting and reporting trouble.

Inspection is perhaps the first line of defense in efficient maintenance. This task should be assigned to men properly trained for the job and they should follow

a schedule set up on knowledge and corrected through experience. Such inspections should be supplemented by regular reports on machine condition, delays and repairs needed from operators or supervisors.

Inspection obviously, however, cannot get at hidden parts but their condition may be reflected in the appearance or action of other parts that are visible. But there are other steps that can be taken. One mine, for example, changes armatures in haulage locomotives every 30 days and in gathering locomotives every 90 days. When the motor cases are opened, the brushes, brush rigging, field coils, terminals and leads are inspected, cleaned and repaired when necessary. The spare armatures then are given a thorough inspection in the shop supplemented by painting and bearing lubrication. Bearings are not lubricated between changes.

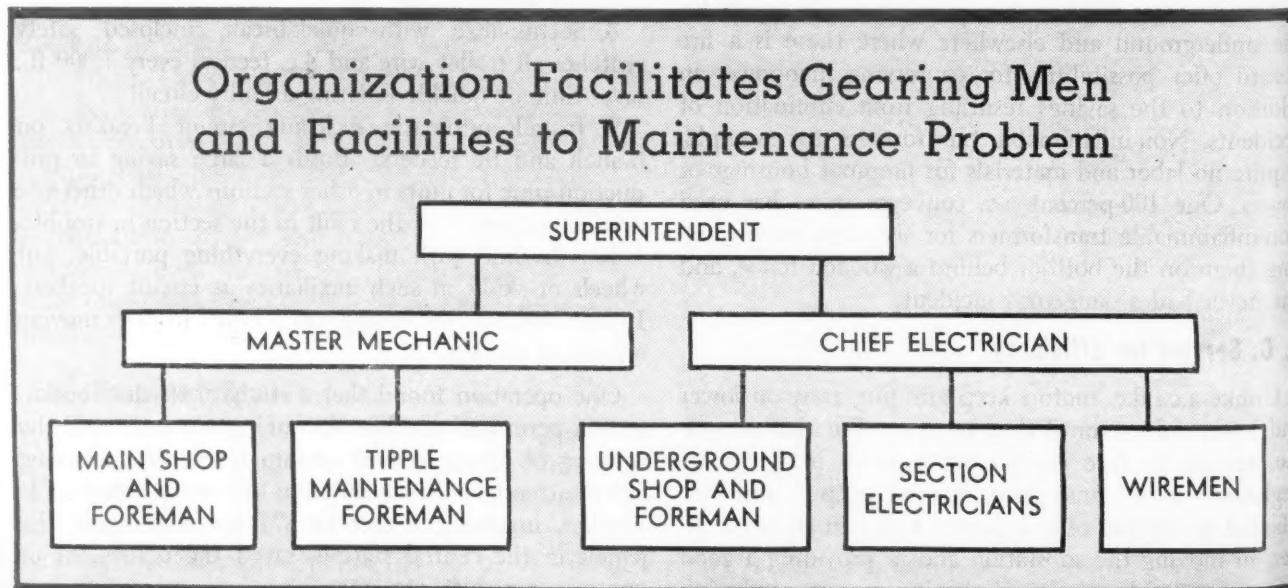
The same principle also is being increasingly applied to such items as sub-assemblies on loading and cutting machines, conveyor drives, etc. Removing them periodically and putting them through the shop for thorough cleaning, repairing and rebuilding makes it possible to keep machines in practically new condition.

## Lubrication and Cleanliness Conserve

Good lubrication and cleanliness are major factors in maintenance along with inspection and good men. Cleaning facilitates inspection and repair and is all-important when a critical and expensive anti-friction bearing, for example, is being replaced, because a little dirt can mean a quick failure.

On the older types of machinery, many coal companies, by minor changes, have improved lubrication and reduced waste in oil and grease while reducing

## Organization Facilitates Gearing Men and Facilities to Maintenance Problem





accumulations of dirt and lubricant adding to the difficulty of cleaning. One company operating locomotives over 20 years old rebuilt them with improved bearings, better grease seals and so on, making it possible to keep operating parts practically spotless. Operators take better care of their equipment, inspection readily detects loose or failing parts and repairmen need not waste valuable time and frazzle their dispositions by first undertaking a mean cleaning job. For the cleaning that still may be necessary, special steam units or solvent tanks in special quarters fitted with chain blocks and draining facilities insure a good job with reduced manpower—often half or less.

That proper lubrication reduces mechanical wear to a negligible quantity is granted by everyone. Proper lubrication requires the right grade of grease or oil, an unfailing supply to the bearing and elimination of dirt by good seals or proper over application of grease to carry out contaminating matter. Rebuilding to improve seals, of course, is the preferred method.

How good lubrication can promote efficient operation is epitomized by the experience of one operation that formerly left it to the machine runners. Full-time men were employed and each was equipped with a \$25 kit (high-pressure grease gun, grease bucket, oil can and small tools). Seventeen were purchased at a total cost of approximately \$425. The men inspect and lubricate the equipment on a fixed schedule and the saving in labor through reduction in breakdowns is estimated at eleven men.

A number of mines have found that mobile lubricating trucks result in better lubrication at a material saving in manpower. Special greasing stations, sometimes including hoists for turning up cars for inspection, adjustment and minor repairs, have been a paying step in mine-car lubrication at many operations. Centralized lubricating systems now automatically assure positive lubrication in the right quantity with a substantial labor saving in a number of breakers and preparation plants. Scheduled lubrication, requiring regular visits entered on an appropriate record have been found a big step toward reduction of equipment failures and maintenance labor at several plants.

### Materials Conserve Labor

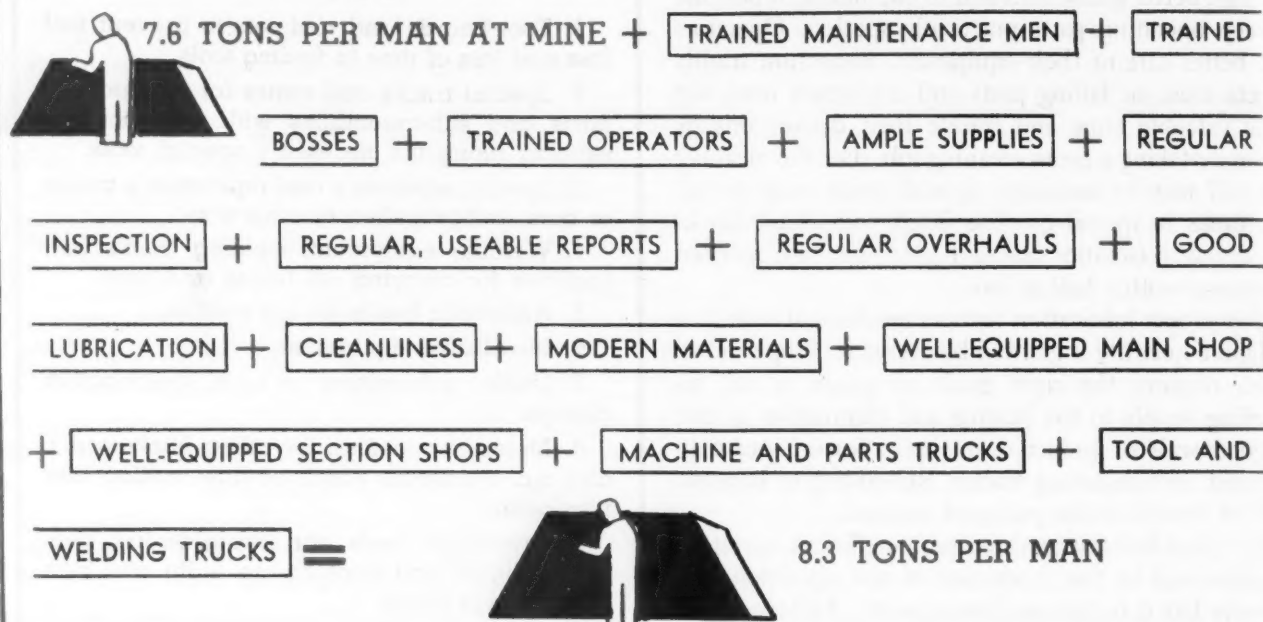
Materials and facilities are additional vital influences on maintenance and manpower in both production and upkeep of equipment. Anything that will resist corrosion, abrasion, etc., while providing the necessary strength and operating characteristics also lessens the liability to machine shutdowns and decreases the time between overhauls and replacements. The possibilities are numerous, but some of the major ones include the following:

1. High-strength corrosion-resisting alloys for mine cars.
2. High-strength alloy shafts, axles and plates for machinery.
3. Stainless steel and other special alloys and metals

## Maintenance Manpower Savers

1. Tool boards and tool sets to prevent tool loss and loss of time in finding tools.
2. Special trucks and crates for transporting parts and sub-assemblies with provision for sending along the necessary special tools.
3. Special wiremen's and repairmen's trucks or cars, self-propelled or otherwise.
4. Welding equipment, welding trucks and facilities for carrying off fumes and heat.
5. Automatic heads for tire welding.
6. Metallizing equipment.
7. Cable vulcanizers with quick-action clamps.
8. Meters for testing, including hook-on d.c. and a.c. ammeters which obviate cutting into insulation.
9. Lever-type tools for straightening conveyor flights and hooking up flight and pan conveyors in place.
10. Insulation slitters and strippers.
11. Special tools for straightening underground conveyor pans.
12. Track-anchored equipment for straightening conveyor pans.
13. Floor anchors in shops for straightening cars with help of hoist or overhead crane.
14. Jigs for welding and machining jobs.
15. Impact wrenches, power threaders, power saws, rivet busters, etc.
16. Hoists over lathes and other machines for handling heavy parts; overhead cranes, monorail cranes, hoists, etc., for moving heavy parts and equipment in shops and into and out of storage facilities.
17. Fork trucks or other self-powered trucks or jeeps for moving parts and materials in shops and yards.
18. Piping of welding and cutting gases and welding current through shops, preparation plants and the like.
19. Heat-treating equipment.
20. Magnetic testing equipment for shafts and other parts.
21. Special trucks for hoisting loader heads and heavy assemblies or parts in shafts.
22. Special trucks for moving loading machines, cutters, shuttle cars and sub-assemblies.
23. Special power units for moving dead loaders and other equipment, such as a heavy coal drill specially fitted for application to loader.
24. Air, hydraulic and mechanical presses for straightening, bending and similar work.
25. Gear and pinion pullers.

## Good Maintenance – Better Manpower Utilization



for screening and other purposes where corrosion and abrasion is a possibility.

4. Use of wood, glass brick, tile and gunite for lining chutes, tanks, bins and other preparation-plant equipment (all used at a number of operations with real savings).

5. Rubber, wood, asbestos-cement, tile and special alloy or metal and lined pipe in drainage lines, culverts and other water-handling installations.

6. Special metals or alloys, rubber and other constructions in pumps.

These and other advances in metallurgy and materials now offer real possibilities in reducing maintenance in coal mining and should be studied carefully by operating and maintenance men. Exterior and interior protection, particularly the former, also is being revolutionized by new protective coatings, and these, too, should have careful investigation.

### Good Shops Promote Good Work

While prevention still is the best means of reducing maintenance and of utilizing mining and maintenance manpower to the best advantage, inspection, overhaul and repair are necessary. The facilities available for such work should insure its being done quickly with the greatest economy in labor. A shop with all the necessary tools and facilities for handling any job that comes up is the first requisite. Very frequently, small, badly lighted and ill arranged shops can quite profitably be replaced by a modern building and facilities with a considerable improvement in quality of work at a reduction in cost. Whether to consolidate or to have several shops is a problem for which there is no absolute answer, although where the distance to the face is great

special trucks and other facilities normally should be employed for quick, easy movement of complete machines to the main shop or auxiliary shops for minor repairs should be located near the working sections, leaving the main shops primarily with the task of major overhauls and rebuilding.

Auxiliary shops should include necessary pits, cranes and hoists for the replacement of parts and sub-assemblies without the necessity of moving the machines farther out to a main shop, unless, as stated, special trucks are provided for that purpose. In addition, the auxiliary shop might well be supplemented, in the opinion of many operating men, with special welding, repair and tool trucks able to go right to the disabled machine and thus accomplish a fair part of the repairing in the working place.

Consolidation of shops, as stated, is a problem largely to be settled according to individual conditions. Where it is feasible, however, the manpower savings are substantial. In one instance, shop equipment at one colliery was transferred to enlarged shops at two others. The resultant concentration and elimination of duplication of standby services, achieved at a cost of \$4,351, saved six men. In another instance, consolidation of three separate drill-repair and drill-steel shops into one and of three machine and blacksmith shops into one, at a cost of \$9,300, saved 13 men.

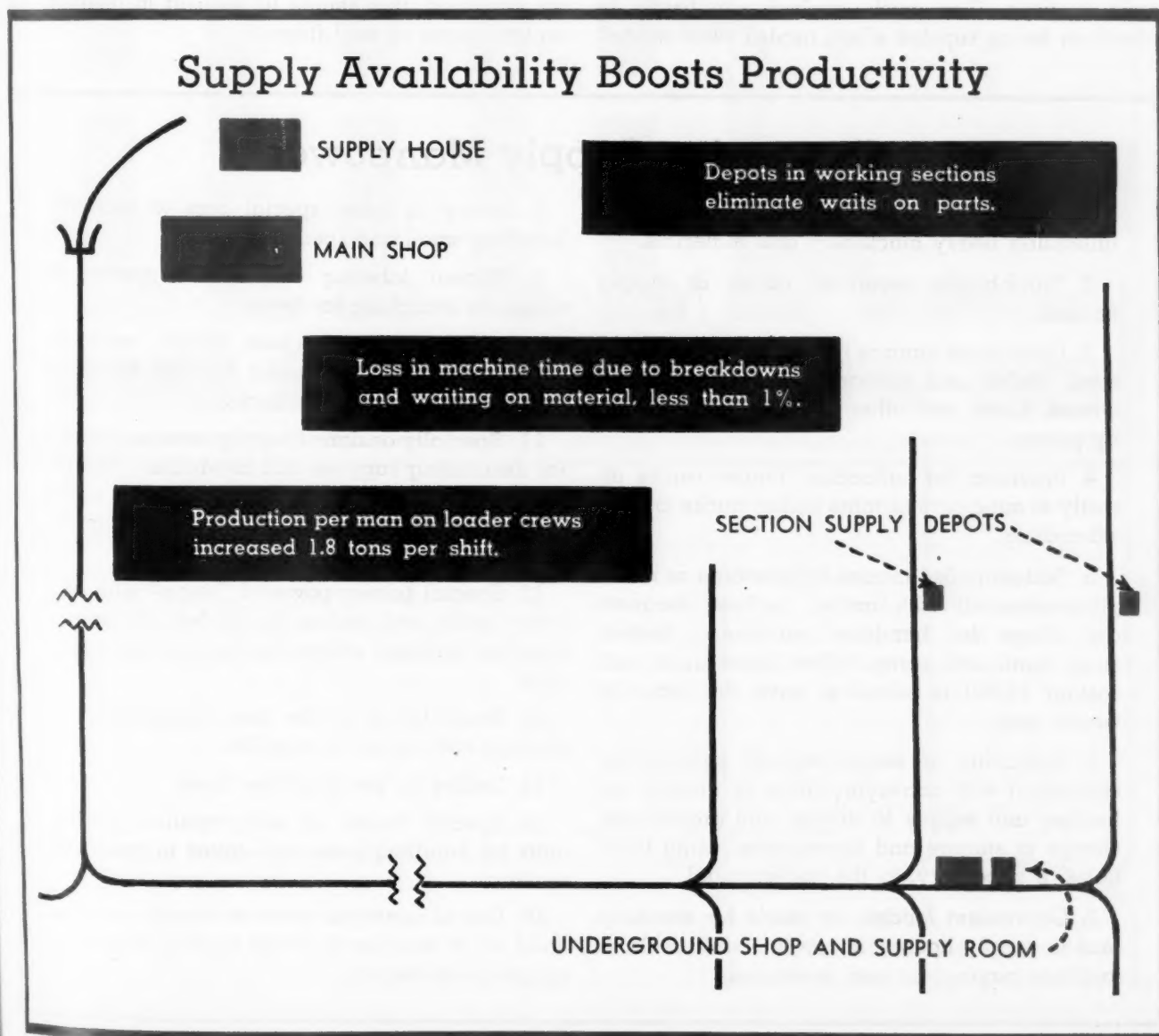
Special shops for certain items of equipment can be real money savers at times. One company has operated for some years special car shops equipped with pneumatic tools of all types useful in the repair of cars, including hoists, cranes and turntables. Investment per stall is approximately \$700. The special facilities and power-driven equipment are estimated to save 36 men.

# Supplies for Higher Efficiency

SUPPLIES AND THEIR HANDLING involve only a relatively small percentage of the labor force at most coal mines. From that it might be assumed at first glance that opportunities for better utilization of manpower were relatively small. Actually, however, supplies and their handling can exert a far greater influence than the number of men directly employed might indicate. The difference between mediocre and good supply service might mean a difference of 1 to 2c. a ton in handling itself and up to 10c. or more in waste and loss of machine and man time when effect on the overall production picture is considered. The question of supplies, therefore, goes considerably beyond that of getting them in, keeping records and getting them distributed, although even here considerable opportunities for better manpower utilization exist.

## Supplies Handy—Production Up

When a machine is down waiting for a part or has its possible production cut short because lack of timber resulted in falls to be cleaned up before a place could be entered, manpower obviously is not being utilized to the best advantage. To lack of parts or timber might be added lack of rails, lack of ties, lack of lubricants and many other lacks, including even lack of sand for locomotives or clay for stemming. If, because supplies and parts are not handy, the output of a loading machine is reduced, say, 30 tons per shift, it might represent loss of the equivalent of two man-shifts of production. Even if another man had to be added to insure delivery of supplies to the right place at the right time, the net would represent a substantial increase in manpower utilization—another example of where





adding a man in one place can result in more than compensating savings in another.

To insure efficient manpower utilization at the face and elsewhere, therefore, experience indicates the supply system should incorporate the following:

1. Expert supply clerks who know the mine, the equipment and the sources of supply.
2. A system of ordering providing supply men with time and opportunity for collecting and delivering parts and materials when needed—and where needed.
3. Enough supply men provided with the necessary facilities to handle the job efficiently.
4. Subsidiary supply and parts depots—especially the latter—in or close to the working sections.
5. Efficient salvage and recovery methods (save material and also the labor and cost of purchasing, receiving and distributing new material).

Meticulous accounting should not be permitted to overshadow the primary objective of maintaining supplies at the points where they are needed. At most operations maximum efficiency and best utilization of manpower dictate the placing of small stocks at strategic locations. Too much emphasis can hardly be placed on having supplies where needed when needed,

even to making sure that a mechanic reaching into his kit for a ball of tape, or a fuse, finds it at hand. His time and the time of the machine crew, all directly influencing production per man, depend on his having what he needs at the time he needs it.

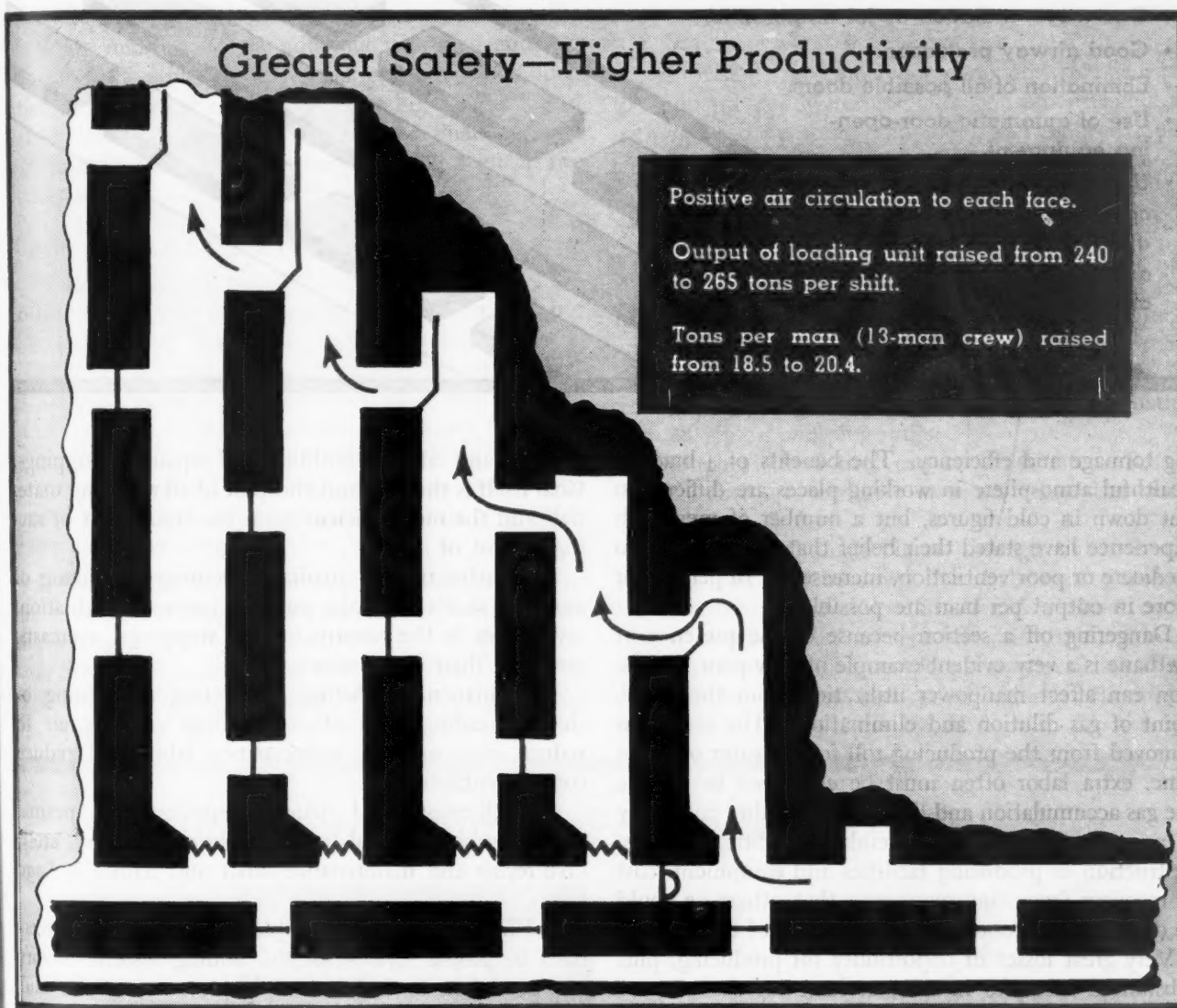
Practice at many operations follows approximately the set-up outlined below:

1. Keeping a small supply of most frequently used parts in the maintenance man's shanty or the section foreman's office; selected items of loader or other parts hung on board or in spaces indicated by outlines.
2. Keeping a supply of parts needed practically every day in the underground shop near the working section, whether only a pit or a larger establishment.
3. Installing the central supply house and accounting office adjacent to main shop, whether underground or outside.
4. If the main supply house is over 200 ft. or more from the shop, installing rotary or other bins in shop to save time of walking to supply house for such frequently used items as cotterpins, washers, bolts and nuts. If repair trucks containing supply and parts items are employed, they should be brought in regularly for replenishment of used items.

## Conserving Supply Manpower

1. Trucks and railroad-car-height ramps for unloading heavy machinery and materials.
2. Truck-height receiving docks at supply houses.
3. Convenient storage racks and platforms for steel, timber and similar items, with monorail cranes, hoists and other facilities for handling by power.
4. Provision for unloading timber trucks directly to mine cars or mine timber trucks to save rehandling.
5. Self-propelled cranes (rubber-tired or caterpillar-mounted) with grabs, buckets, magnets and slings for handling machinery, timber, steel, sand and scrap. One home-made unit costing \$4,800 is stated to save the labor of twelve men.
6. Automatic or semi-automatic sand-drying equipment with conveyor, crane or gravity unloading and supply to dryers, and gravity discharge to storage and locomotives, using boreholes, if necessary, to the underground.
7. Convenient ladders or stools for reaching bins in supply houses; shafts for cable reels to facilitate paying out and measuring.
8. Rotary or other special bins to facilitate handling small and special items.
9. Efficient labeling and record system to eliminate searching for items.
10. Oil houses with chain blocks, working-height racks and provisions for fast filling of containers or lubricating trucks.
11. Specially designed supply cars and trucks for distributing supplies and materials. Timber-setting jacks and special timber-recovery units, such as hoists on locomotives, logically supplement special timber trucks.
12. Special battery-powered "jeeps" with carrying decks and hitches for trailers for use in trackless sections, unless shuttle cars are available.
13. Small hoists at the face, particularly in pitching coal, to pull in supplies.
14. Dollies for use in shaker lines.
15. Special hoists or self-propelled pulling units for handling pans and drives in conveyor sections.
16. Use of conveyor pans as supply carriers (load up at room neck before moving to face to couple on conveyor).

# Good Air With Less Man-Hours



VENTILATION involves manpower, not only in construction and maintenance of facilities for getting air to the working faces but also in the effect of that air, or lack of it, on the efficiency of production men and on the mine accident rate. With ventilation, as with several other mining activities, the indirect effect of ventilation on manpower utilization may be several times that of possible reductions in labor involved in establishing and carrying on ventilation, although even here some real savings are possible.

## Good Air—Better Work—Greater Safety

Ventilation has two primary objectives:

1. Creation of a healthful atmosphere in which work can be carried on efficiently.
2. Diluting, rendering harmless and carrying off explosive gases, dusts and fumes.

One objective is closely tied to another and when ventilation is arranged so that one is attained the other also is achieved, as a general rule, automatically.

Waiting for smoke, fumes and dust to clear is just as much a burden on production as waiting for a trip to be put back on the track. Plenty of air, directed to the point where it is needed by such positive means as brattice lines, assures quick removal of smoke, fumes and dust and permits work in a place to be resumed that much quicker, with consequent improvement in utilization of manpower.

Working in a clean, clear, cool atmosphere is equally or more important from the standpoint of production, as experience at many mines has proved. Fumes and heat, assuming men are willing to go back into them, are bound to have their effect on performance, sapping initiative, slowing down the work and adversely affect-



## Air With Less Labor

- Fewer and better stoppings.
- One-way ventilation as far as possible.
- Good airway protection.
- Elimination of all possible doors.
- Use of automatic door-opening equipment.
- Use of machinery in constructing ventilation facilities and cleaning airways.

ing tonnage and efficiency. The benefits of a bracing, healthful atmosphere in working places are difficult to put down in cold figures, but a number of men with experience have stated their belief that, as compared to mediocre or poor ventilation, increases of 10 percent or more in output per man are possible.

Dangering off a section because of the presence of methane is a very evident example of how poor ventilation can affect manpower utilization from the standpoint of gas dilution and elimination. The section is removed from the producing roll for a greater or lesser time, extra labor often must be employed to remove the gas accumulation and there is the further possibility of an explosion, with its attendant fatalities, injuries, destruction of producing facilities and equipment, cost of recovery (requiring manpower that otherwise could be devoted to productive work) and loss of tonnage.

Very great losses of opportunity for producing, plus substantial increases in cost, at least for that day or days, can result from fan stoppages at many mines. The answer at a number of operations is standby equipment, ranging from an extra motor or internal-combustion engine with arrangement for quickly shifting drives up to duplicate power lines, transformer sets, motors and other facilities and automatic controls.

### Conserving Manpower in Ventilation

Labor directly expended in ventilation very frequently is larger than might appear at first glance. This is especially true if the long-time view is taken, which also leads to the conclusion that a somewhat higher expenditure of manpower at the start may be returned many-fold in the future. By making such expenditures, also, the full benefits of the principles underlying good ventilation may be obtained. Examples of better manpower utilization in this and other directions include the following:

1. Development of a mining system which reduces the number of stoppings to a minimum, thus saving

both air and labor in building and repairing stoppings. Coal itself is the best and cheapest of all stopping materials and the most efficient from the standpoint of saving in cost of air.

2. Construction of auxiliary openings or sinking of auxiliary shafts to make possible one-way ventilation; saves labor in the construction of stoppings, overcasts, etc., and their maintenance.

3. Permanent timbering, concreting and lining of shafts, headings and other openings carrying air to reduce clean-up and maintenance labor and reduce cost of ventilation.

4. Well-constructed airtight stoppings of a permanent fireproof material (concrete, brick, masonry, etc.); save repair and maintenance labor and reduce leakage losses.

5. Elimination of all possible doors in favor of overcasts by proper revision of the mining system. Doors require labor to build, install, move, maintain and repair, in addition to trappers to operate them. Use of metal culvert tubing is one method of conserving manpower in constructing overcasts.

6. Use of automatic door-opening equipment at points where doors must be employed, saving the labor for attendance that could be employed elsewhere.

7. Use of loading machines or other mechanical equipment in airway cleaning, supplemented by special provisions for entering airways and laying track or establishing rubber-tired haulage roads.

8. Installation of special equipment for introducing hoses through stoppings or machines through locks for rock-dusting of airways, thus conserving labor in what otherwise is a difficult and time-consuming job.

9. Special equipment and tools for handling materials and building stoppings, overcasts and other ventilation installations. Compared with usual manhandling of materials and hand work, labor savings often will return the cost of trucks, mixers and air or electric tools within a year.



# Water Handling With Less Labor

DRAINAGE is one of several activities in coal mining involving manpower in conducting it and in addition materially affecting the use of manpower in other operations. Like many other activities, also, planning and use of labor in advance can save many man-hours in pumping and loss of opportunity for production in the future with its attendant increase in mining cost.

## Gravity Conserves Manpower

Water that is kept out of the workings does not have to be handled and consequently requires neither labor nor expenditure for power and pumping facilities. Eliminating one pump, for example, can release as many as three attendants daily for other work with a saving of over \$7,500 in wages alone in the course of a year of continuous operation, in addition to the power and equipment savings, which usually are as great as or greater than the saving in wages. Methods of keeping water out of workings include:

1. Ditches on the surface ahead of breaks; flumes of metal or wood across breaks and other openings into the workings.
2. Sealing of stream beds.
3. Grouting or cementing of cracks and water-bearing

strata in the mine and in shafts and other openings.

4. Sealing of worked-out sections.

5. Provisions for emergency dams and storage areas to impound floodwater for later convenient handling with reduced pumping equipment and reduced labor.

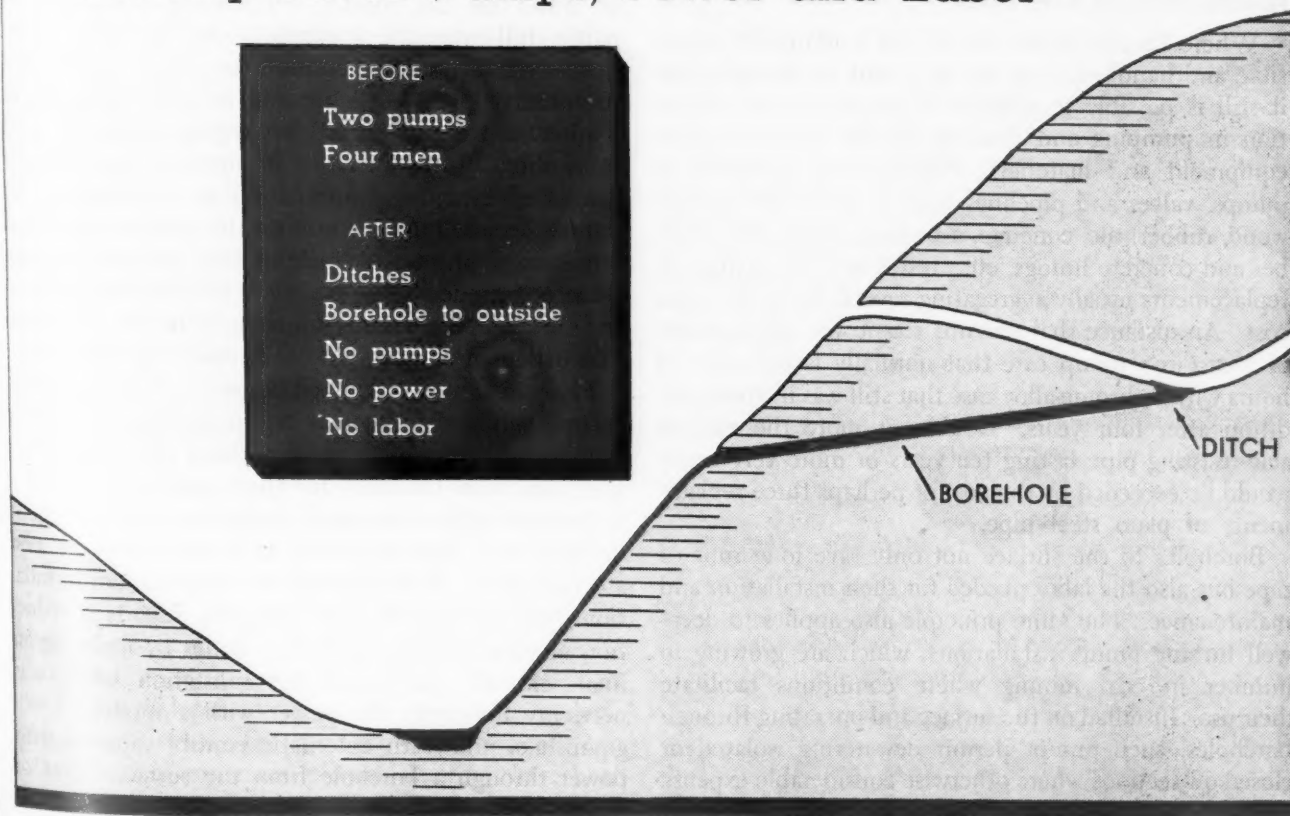
Making use of gravity is another very effective way of conserving manpower and reducing drainage cost. Means include:

1. Tunnels and drainways in rock or coal, either to the outside or to central locations where more efficient handling of water is possible with higher-capacity, modern pumping stations. Relatively simple tunnel installations can return big savings at times. One mine, for example, drove a 1,450-ft. rock drainway and eliminated two 500-g.p.m. pumping units.

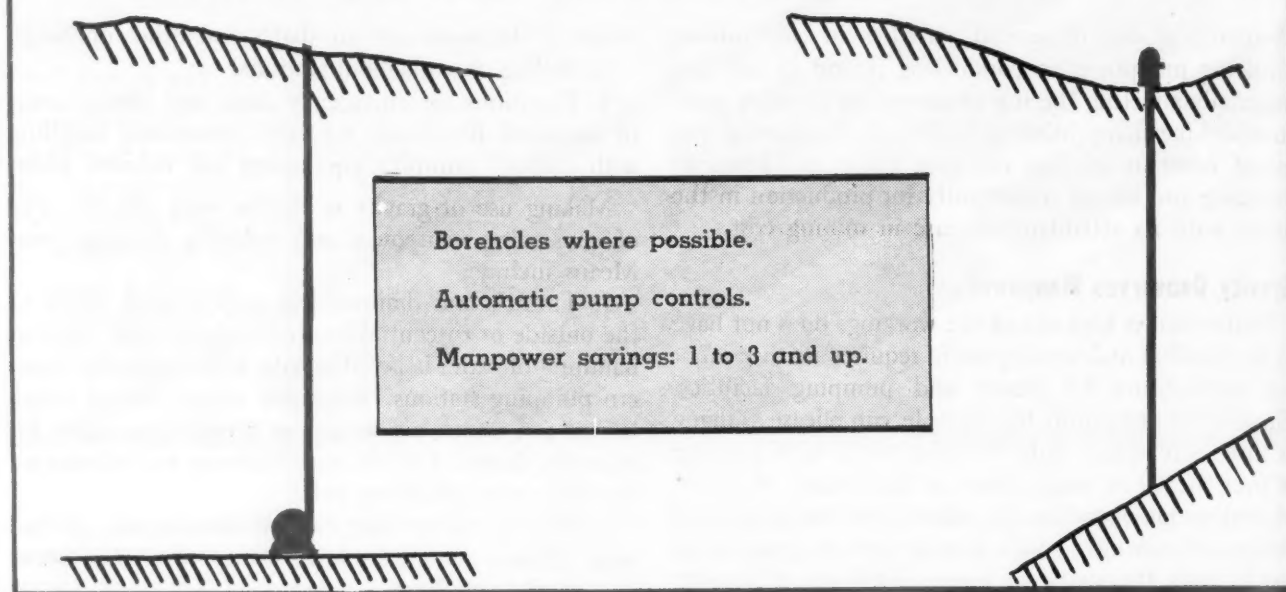
2. Ditches where they can be constructed. Rather deep ditches are advisable at times when the water flow is relatively large.

3. Boreholes through pillars, through outcrops and through rock inclined down to outfalls on the outside (or to central pumping locations inside). Holes up to several hundred feet are possible with the relatively simple and inexpensive equipment now available. One operation reports that ditches and boreholes eliminated

## Gravity Saves Pumps, Power and Labor



## Modern Pumping Conserves Manpower



the need for certain gathering pumps in local basins, with a saving of five men in addition to power and equipment. When the cost of one man's wages and power for a year are considered it will be found that in many cases the cost of such boreholes is returned in a very few years—sometimes not over one.

4. Siphons—still a cheap and effective way of handling water without labor or power.

### Modern Facilities Save Labor

Where keeping water out of the workings is impossible and handling it by gravity is out of the question, it still is possible to achieve better manpower utilization in pumping and drainage by the use of modern equipment and materials. Acid-resisting materials in pumps, valves and pipelines (special alloys and metals, wood, rubber, tile, concrete, asbestos-cement, fiber, rubber and concrete linings, etc.) result in labor savings in replacements usually aggregating several times the extra cost. An instance that remains classic was replacement of a cast-iron pump case that normally lasted only 24 hours with a chrome-alloy case that still was in good condition after four years. Double or more the cost of acid-resisting pipe lasting ten years or more very easily would be exceeded by the cost of perhaps three replacements of plain steel pipe.

Boreholes to the surface not only save long runs of pipe but also the labor needed for their installation and maintenance. The same principle also applies to deepwell turbine pump installations, which are growing in number in coal mining where conditions facilitate their use. Installed on the surface and operating through boreholes, such pumps permit dewatering isolated or closed-off sections where otherwise considerable expense might be involved in maintaining openings into such

areas for men and pipelines or in handling the water by some other and more costly method. Since these pumps operate from the surface, installation usually is cheaper and more economical of manpower and they lend themselves well to operation without attendants.

Modern pumping units of the conventional centrifugal type also can provide benefits in greater efficiency, lower maintenance and reduced manpower, especially when supplemented by provisions for a constant head of water on the intake, self-priming equipment or partly full-automatic controls including self-priming. Semi- or full-automatic controls have been widely used to conserve pumping labor and in most cases reduce manpower to that needed for regular inspection and lubrication. In at least one instance an automatically controlled centrifugal installation is supplemented by a small deepwell-turbine unit on the suction side which serves as a primer and suction-like pressure booster. Benefits include double the life of the main-pump rotating unit and elimination of interruptions due to suction difficulties, in addition to other operating advantages.

Manpower-conserving facilities also include automatic suction valves which enable one pump to draw from a number of sumps without a multiplicity of gathering units and men necessary for their operation.

Instances where automatic controls and other modern developments have saved one to a dozen or more men are numerous. As an example of what modern installations can accomplish, one company reports a reduction of three men for pumping duties by replacing an inefficient d.c. pump and the substation which was necessary to supply the power with a modern 1,500-g.p.m. a.c. unit with automatic control supplied with power through a borehole from the surface. Cost of the installation was reported as \$7,308.



# Safety for Manpower Conservation

**SAFETY** is not a thing apart, with only a minor or non-existent influence on mining results. It directly affects unit production, individual productivity and cost.

Unsafe conditions can mean not only injuries to men but also damage to equipment and interference with the orderly completion of the working cycle. To this handicap must be added the effect of injuries on morale, plus the losses of continually putting new men (even if obtainable with or without experience) into a crew. One wreck or a heavy fall of slate, even if it results in no injuries or damage to equipment, can cause the loss of, say, 50 tons of coal from a section in a shift. If lack of proper safeguards results in many such instances, the output of a territory or of a mechanical-loading unit can suffer severely.

Then there is the question of effect on cost. If the average cost of a fatality were assumed to be \$7,000 in compensation (frequently it is much more), cost per ton in bituminous mining in 1944 (1.8 deaths per billion tons) would have been 1.26c. per ton; anthracite (2.8 fatalities), 1.89c. Cutting the bituminous rate to 1.0 and the anthracite rate to 1.5, assuming the same compensation figure, would cut cost 0.56c. per ton in bituminous, and anthracite 0.85c. But fatality costs are only part of the picture. Non-fatal injuries must be counted, as well as the indirect cost of injuries, which many authorities state to be equal to or more than the direct cost. Taken all together, good safety conditions as compared to fair or average, offer savings of 3 to 5c. per ton and up, in the opinion of many experts on the subject. If the saving were 5c. per ton, the annual total (200-day year) would be \$15,000 for a mine producing 1,500 tons daily; 280-day year, \$21,000. In addition, such a property could well expect an increase of 10 percent or more in output per man-shift and a lower bill for rebuilding equipment and recovery of working territory and its restoration to producing condition.

Such savings as those listed previously warrant fairly heavy expenditures for such things as safer and more efficient equipment, improvement in mine and plant condition, better timbering and similar safety measures, with the assurance that the necessary investment will be returned in a relatively few years while the cut in cost will continue indefinitely.

The principles of safe operation and the methods of achieving results are well known. Consequently, it usually is just a matter of deciding to put them into effect—and sticking to that decision. When safety is made the first consideration, the necessary standards have been adopted, the requisite improvements and changes in equipment and physical facilities have been made and the idea has been thoroughly sold to super-

visors and men, higher efficiency and lower costs inevitably follow.

## Starts at Top—Benefits Everybody

Safety results start with top management, which must be sold on its value, and then sell everybody down the line. This conviction makes it automatic that plant and equipment be put in the best possible condition and kept that way as the first line of defense against injuries. It also makes automatic the installation of

## Safety Manpower Savers

1. Management sold on safety.
2. Good records of accidents, their causes and cost.
3. Strong, efficient safety organization and well-trained bosses with a firm belief in the benefits of safe operation.
4. Employee, family and community support.
5. Complete code of safe working practices.
6. Thorough safety training and education.
7. 100-percent first-aid and rescue training.
8. Thorough accident investigation.
9. Good housekeeping and regular inspection of plant, equipment and facilities.
10. Clearances, refuge holes and safe haulage facilities.
11. Good lighting.
12. Equipment designed, guarded and otherwise arranged for maximum safety.
13. Good ventilation.
14. Permissible equipment and materials; complete electrical safeguards.
15. No smoking, fire, open lights underground.
16. Ample fire-fighting equipment, materials.
17. Ample first-aid and rescue equipment.
18. Rock-dusting, rock-dust barriers and sprinkling underground.
19. Systematic timbering.
20. 100-percent protective clothing.



permissible equipment and materials, good ventilation to the working face to reduce the gas hazard, eliminating all possible sources of gas or dust ignition, elimination of all possible fire hazards (including prohibition of smoking and open lights underground), good storage and handling of explosives, oil, grease and other inflammable or explosive materials; guarding of all machinery and electrical installations; installation of fire-fighting, first-aid and rescue equipment; rock-dusting, rock-dust barriers and sprinkling; clearances and refuge holes, good lighting, 100-percent protective clothing and systematic timbering—the latter, with regular inspection and sounding, being the major safeguard against falls off roof, which still rank first as a cause of injuries and fatalities in coal mining. Safety posts, jacks, bars or other temporary support are an essential supplement to systematic timbering elsewhere in mines.

For maximum results, safety work needs constant supervision, direction and pressure, plus records, investigation, inspection and education. A strong safety organization, which does not mean that it necessarily must be large, is a big step toward achieving such results. To really uncover the opportunities for progress and check on it as it is made, complete records are a necessity, and such records should include the cost of each injury, direct and indirect, and take in the cost of

repairing or replacing equipment and reopening the place.

Constant inspection to reveal hazards, supplemented by reports from supervisors, plus thorough investigation of every injury in conjunction with the immediate supervisor and other interested parties is a major activity that the safety organization could well discharge. Investigation of accidents should, by all means, also include those not resulting in injury, because a recurrence might not find everybody so lucky.

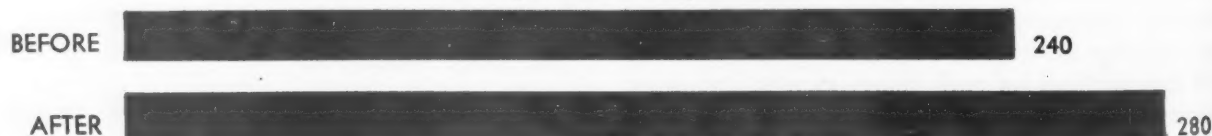
Miners also have a part in safety, and the success of any program is reflected in how well their interest is aroused and cooperation enlisted. One step is thoroughly sold and thoroughly grounded bosses able to pass the gospel along. Enlistment of family and community support normally pays real dividends. A safety code, supplemented by regular dissemination of information on accidents and safe working methods, is an essential element in the programs of a number of companies with better than average records. Some chance at a material reward for safety achievement has been found a helpful incentive at some properties. Training in first-aid and rescue work rounds out educational work, and not only insures having this vital life-saving skill in times of need but has been found one of the most effective ways of all in stimulating interest in safety and participation in safety work.

## Safer Mining—Lower Cost—Higher Productivity

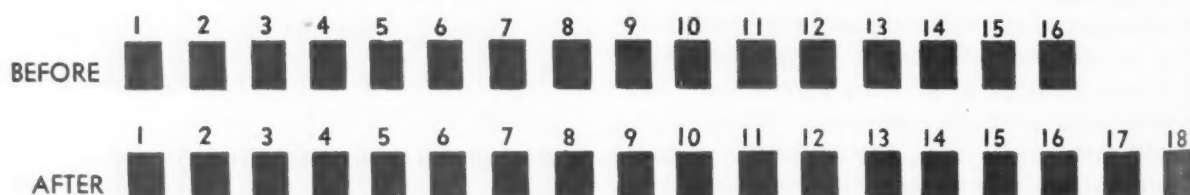
### Compensation Cost



### Tons per Loader per Shift



### Tons per Man-Shift (15-Man Crew)



# Stripping With Fewer Man-Days

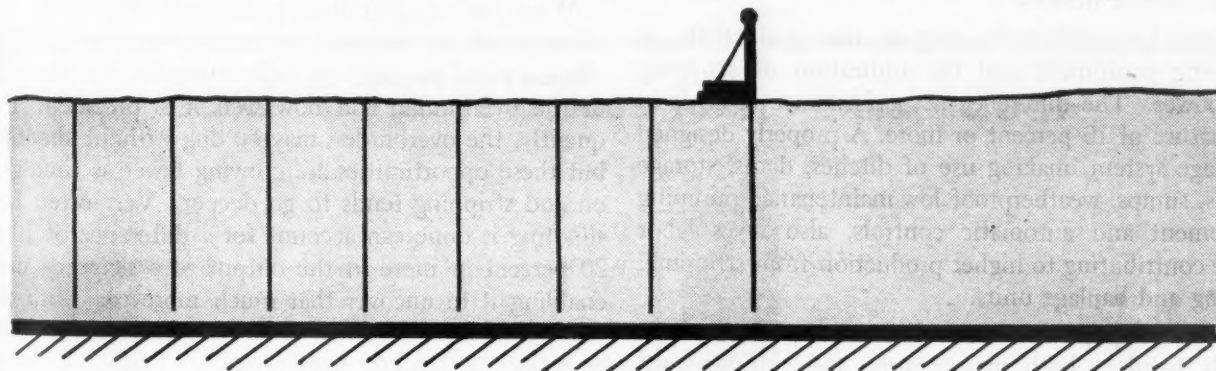
ONE OF THE MOST HIGHLY MECHANIZED of all mining operations, coal stripping is distinguished by high output per man employed. The greater investment in equipment makes it even more important that this equipment be given the best possible opportunity to operate at or close to the capacity built into it for most efficient use of manpower and lowest cost. Since the manpower is the same in both cases, as a general rule, operation at, say, 95 percent of capacity instead of 85 means better utilization of manpower, more coal from the same facilities and a lower cost. Some of the principles reflected in high utilization of capacity and conservation of labor at the more efficient stoppings are reviewed in the following:

## Good Service—Higher Productivity

Shovels, trucks and other large moving equipment attract the eye and the attention. Nevertheless, they

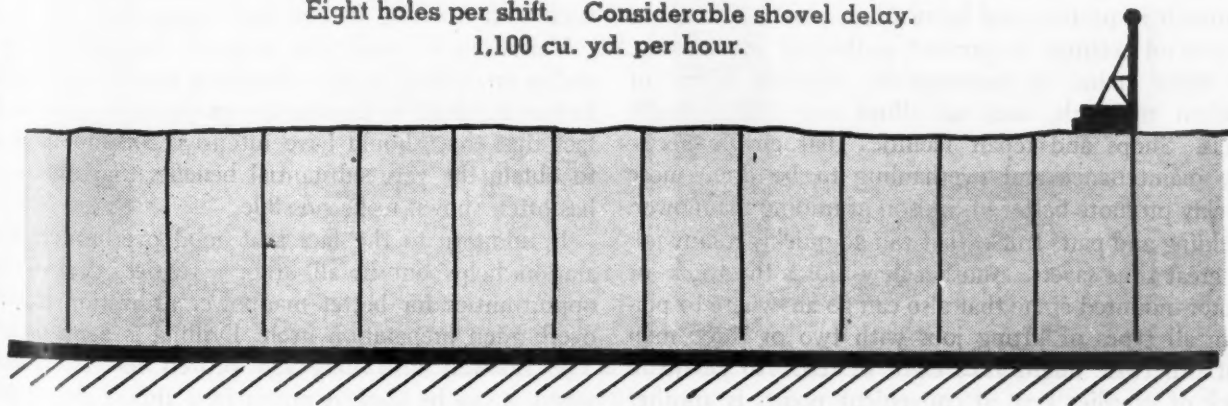
are dependent on some of the humbler and less spectacular activities for their ability to operate efficiently and, in some cases, their ability to operate at all. Power is essential, it goes without saying, and the efficiency-promoting aspects of stable voltage and supply may warrant, among other things, installation of power-factor-corrective equipment and facilities for reducing line-voltage fluctuations. Conserving manpower in electrical service also involves provisions for charging cables with a minimum or no loss of stripping and loading time; power equipment for moving cables and switch-houses; and transformer outfits, junction boxes and the like fitted with skids or hitches for loading into trucks for quick movement to new locations. Ground protective and other safety features conserve manpower and reduce loss of productive time by reducing injuries and damage to facilities. Unit substations and three-phase transformers are growing in use because of

## Good Preparation—Less Labor—More Yardage



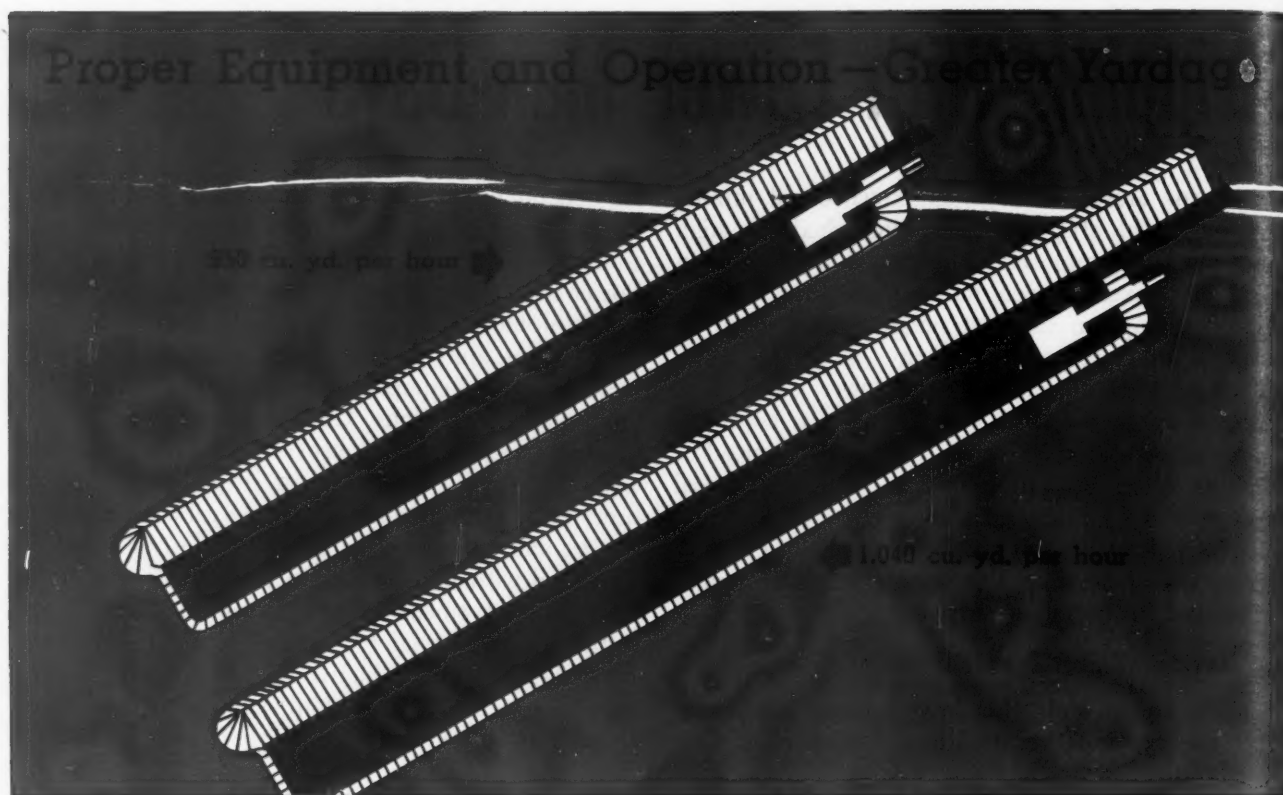
### BEFORE

Eight holes per shift. Considerable shovel delay.  
1,100 cu. yd. per hour.



### AFTER

Twelve holes per shift with higher capacity drill.  
Better shooting of overburden.  
1,220 cu. yd. per hour.



convenience in installation, hooking up and moving, and protective devices.

Water has a direct bearing on the productivity of stripping equipment and the utilization of stripping manpower. The difference in performance often is in the nature of 10 percent or more. A properly designed drainage system, making use of ditches, dams, storage ponds, sumps, weatherproof low-maintenance pumping equipment and automatic controls, also saves labor while contributing to higher production from stripping, loading and haulage units.

Keeping equipment in condition to operate continuously involves both maintenance and supplies (see also preceding sections on these subjects). Regular, thorough inspection and lubrication, plus maintenance of control settings to prevent prolonged overloading, are major factors in maintenance. Another is use of modern materials, such as alloys and high-strength steels. Shops and repair facilities that enable necessary maintenance and overhauling to be done more quickly promote better utilization of mining manpower. Welding and parts trucks that can go quickly to any job are great time savers. Another new tool is the truck- or tractor-mounted crane that also can go anywhere to perform all types of lifting jobs with two or three men that otherwise might take eight or ten. An adequate stock of supplies kept at convenient points is another aid to increased production. A number of operations keep stocks of small frequently needed parts on the shovels or in a supply shack or foremen's or electrician's shanty in close proximity to the stripping and loading location.

### Good Shooting—More Tonnage

What the stripper does pretty well determines the efficiency of any stripping operation. In turn stripping efficiency and productivity reflect directly the character of the overburden and how well it is prepared. Frequently, the overburden may be dug without shooting, but these opportunities are growing fewer as time goes on and stripping tends to go deeper. Very often how shooting is done can account for a difference of 10 to 20 percent or more in the output of a stripping unit, enabling it to uncover that much more coal with the same thickness of material or to uncover the same quantity in thicker overburden. Good overburden preparation also materially reduces excavator maintenance with a saving in cost and manpower.

Variations in conditions make it impossible to generalize on drilling patterns, breaking mediums and other factors involved in overburden preparation beyond the fact that they should have intensive continuous study to obtain the very substantial benefits that experience has often shown to be possible.

In addition to the fact that good overburden preparation helps out in all other activities, considerable opportunities for better manpower utilization exist in overburden preparation itself. Drilling is a major one. The sidewall drill long ago proved its effectiveness where it can be used. A power feed almost always pays for itself and new hydraulic types offer additional advantages. But the sidewall drill is not universally applicable, and vertical units provide definite advantages under certain conditions of overburden.

Where vertical equipment is employed, more and

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more operators are going to augers, to rotary oil-well type equipment and to bigger churn units which enable the same men to put down 50 to 100 percent more footage in the same time. The opportunity for drilling larger holes which these higher-capacity units also provide, making possible larger charges, also has made it feasible to secure equally good breaking with increased hole spacing, thus achieving an additional saving.

#### Better Methods—Higher Efficiency

Opportunities for saving manpower and cutting cost in stripping and loading lie in two major directions:

1. Increasing output of existing units.
2. Installing larger units that can be operated with the same number of men.

Fundamentally, doing any job with one machine and one crew is the cheapest in both manpower and money. But, nevertheless, there are limits, these limits in stripping usually being depth of cover. Where depth is too much for the regular equipment it naturally becomes necessary to use auxiliary units, such as draglines, scrapers and the like, even though it requires somewhat more investment and labor, or let the territory go unstripped or to deep mining. Possible cost that may be obtained and the price of the coal in the market are the determining factors.

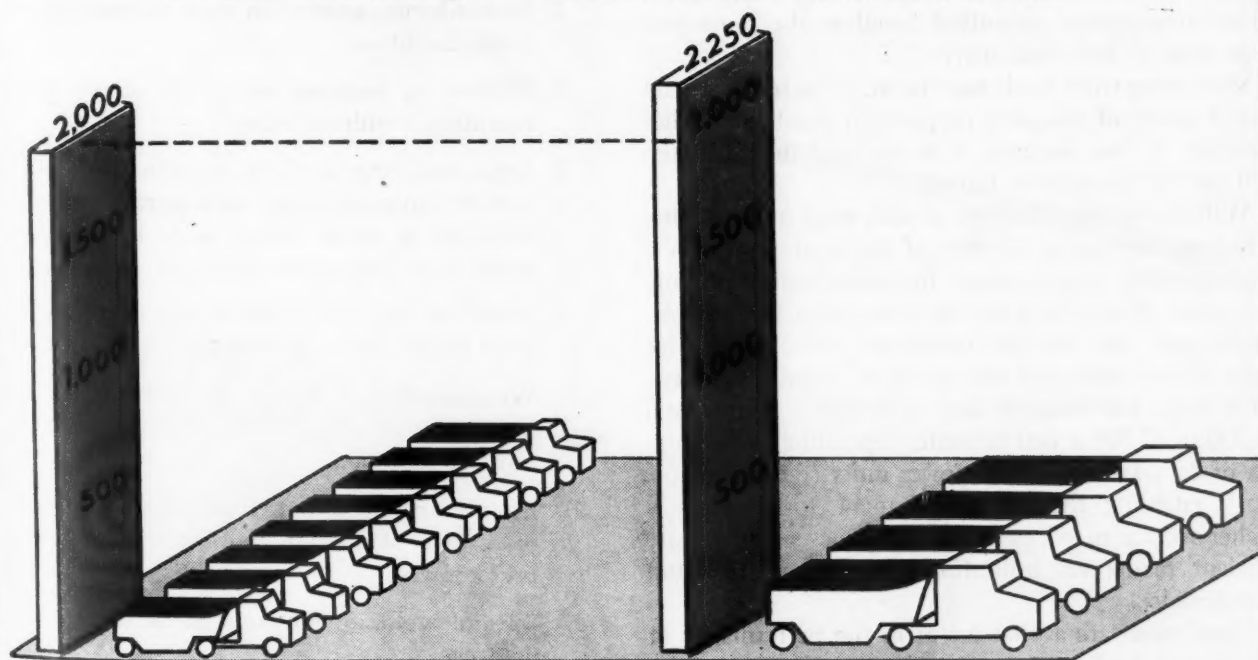
There are times, however, when auxiliary units and

men pay off even though it is possible to operate with one unit. A familiar example is a bulldozer to save the big stripper part of the clean-up job. Scrapers, draglines and other units for handling slides and miscellaneous dirt-moving jobs relieve the main units of this relatively less efficient job and enable them to continue at their regular work, where their productivity is greatly increased. Some rehandling of spoil is justified at times, even where overburden is not unduly thick. The test is whether with two machines the output per man and per dollar of investment is greater than with one.

Bigger, lightweight dippers and buckets have been a widely adopted method of enabling the same machine and crew to increase production materially and utilize manpower to better advantage. Dipper and bucket design better related to the digging and coal loading have been found very helpful. Such apparently small things as installing equipment to keep material from freezing in and on dippers in cold weather and to prevent cracking of dipper handles have substantially increased yardage. New electrical controls on new units or to replace older controls on equipment in service are commonly credited with increasing shovel yardage up to 10 percent or more, with greatly decreased wear and tear on equipment.

Much coal is dug without shooting, but where it tends to be hard shooting materially increases the out-

### Good Haulage—Less Men—More Coal



BEFORE

Eight haulage units.  
Ten haulage men.  
Fair roads.  
2,000 tons per day.

AFTER

Four haulage units.  
Six haulage men.  
Good roads.  
2,250 tons per day.

put of the loading shovel. Cleaning prior to loading, where much of it must be done, uses considerable labor which can be reduced by such things as bulldozing and power sweeping. Scarifier attachments for tractors have been found very helpful in removing thin layers of slate or cappy coal before loading in some pits.

### **Efficient Haulage—Less Manpower**

Transportation normally is one of the bigger users of manpower in stripping. Formerly it was largely concentrated in laying and moving track and on maintenance of locomotives and cars; in recent years, in driving and maintaining trucks and building and maintaining roads. With the development of automotive haulage, however, has come a truer appreciation of the place and value of rail transportation. Where tracks are permanent and modern low-maintenance rolling stock is employed, rail transportation often still is the cheapest method of transporting coal because it permits movement in large quantities with a minimum of manpower. That principle underlies the several dual haulage systems now in existence, which employ automotive equipment in pits (where otherwise considerable labor would be necessary for track shifting and considerable interference results) and supplement the trucks with rail equipment for the last stage to the preparation plant.

Evidence of the savings possible by properly relating rail and truck haulage is afforded by experience at one anthracite operation, which eliminated a three-mile haul to the breaker by dumping to an existing rail siding, using a rock-filled timber ramp costing some \$300. "This arrangement permitted handling the same tonnage with 15 less truck drivers."

Shortening truck hauls was the major factor in several recent moves of complete preparation plants and other facilities. In one instance, it is expected that this step will pay out in not over ten years.

With automotive haulage, as with most other mining activities, increasing the size of the unit results in a corresponding improvement in utilization of mining manpower. Four 40-ton tractor-trailer units, for example, might cost, say \$65,000, compared with \$80,000 for eight 20-ton units, but the saving in wages for drivers, aside from maintenance and attendance, might total \$6,000 to \$7,000 a year or more, depending upon number of days worked. Better power units (diesel, butane, etc.), enabling the same equipment to maintain a higher average speed, especially up grades, also promote efficient manpower utilization and save in fuel and maintenance.

Good roads are a vital factor in the performance of automotive haulage, with experience indicating an increase of 10 to 20 percent or more in tonnage with greatly reduced wear and tear on equipment and longer life for tires. Seven elements of good truck roads are:

1. A compact, firm subgrade of good materials.
2. A deep drainage ditch on each side with other facilities for keeping the subgrade dry.

3. Sufficient width for safe passing without stops or speed reduction.
4. A solid, strong foundation of stable materials under the running surface.
5. A waterproof running surface.
6. A dustproof running surface.
7. Minimum grades (less than 1 or 1½ percent, in the opinion of many authorities).

### **Conserving Stripping Manpower by Better Service**

1. Unit substations and three-phase transformers.
2. Special facilities for reducing or eliminating cable-changing time.
3. Slids or lifting equipment on transformer units, switchhouses and junction boxes to facilitate movement by tractor or truck.
4. Powered equipment for cable moving.
5. Ground protective and other electrical safety facilities to reduce injuries and damage to equipment.
6. Complete, efficient protection against lightning.
7. Power-factor correction and voltage-regulation facilities.
8. Ditches for keeping water out of pits and handling it without labor.
9. Dams and other facilities in ravines and gulleys to impound water and permit orderly disposal in slack times; may be supplemented by automatic pumping equipment.
10. Concrete, wood or metal drainways through spoil for handling pit water.
11. Weatherproof pumping units with automatic control to reduce labor in maintenance and attendance.
12. Regular inspection and lubrication of equipment; use of modern materials to prevent breakdowns.
13. Special welding, tool and parts trucks for field use.
14. Truck- or tractor-mounted cranes for field and yard use.
15. Parts supplies in or near shovels and other equipment.



# Preparation With High Productivity

QUALITY OF PRODUCT is the major goal in preparation and is achieved through cleaning, sizing, mixing, blending, drying, dustproofing, tramp-iron removal and laboratory control. But while modern facilities are installed primarily to achieve the cleaning, sizing and convenience advantages prized by the user, there is no reason to assume that they cannot also be used to realize substantial improvements in manpower utilization. Preparation is becoming more and more a mechanical process and throughout coal mining the machine is the big means of conserving labor and cutting cost.

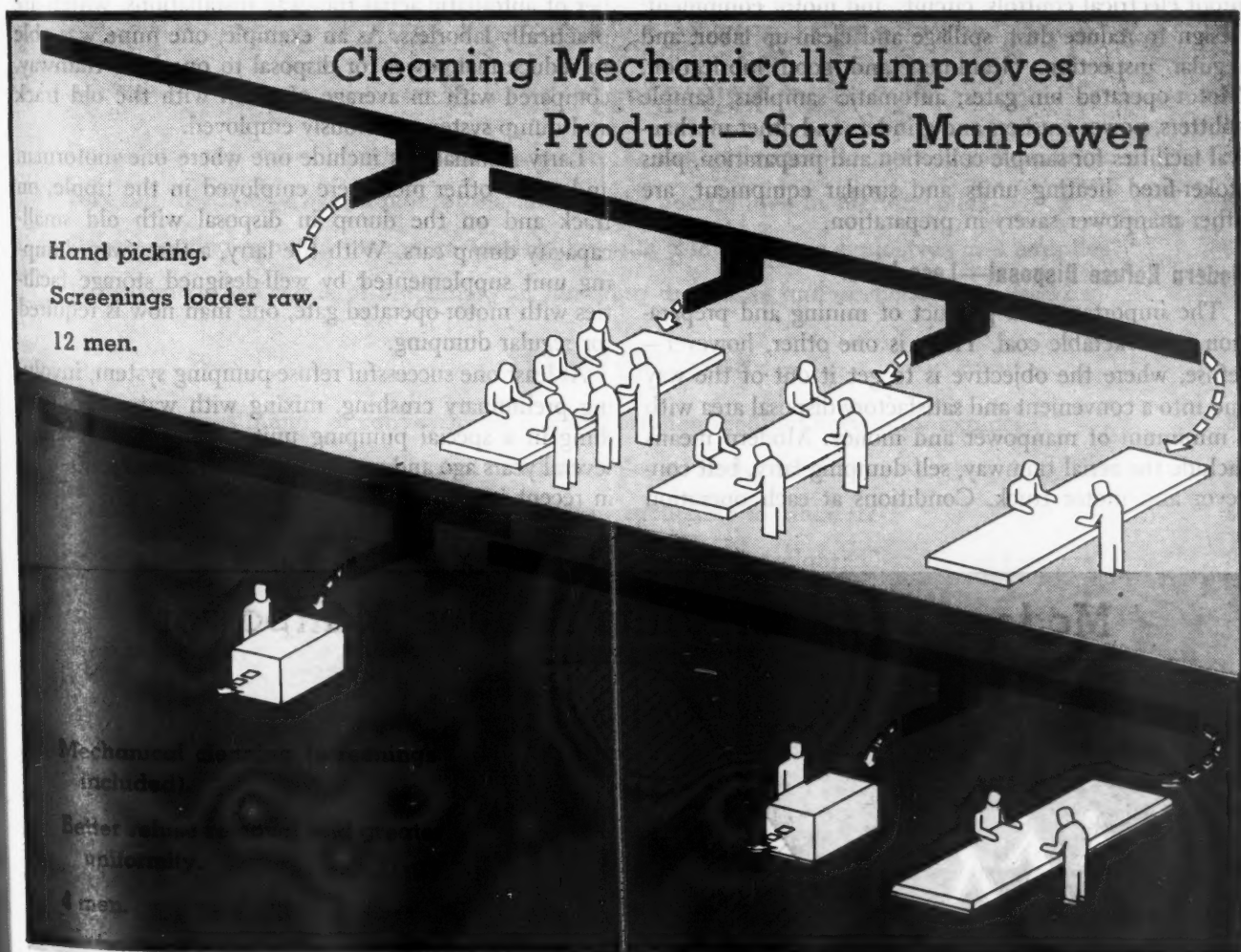
## Mechanical Cleaning—Less Manpower

One of the major byproducts of the numerous installations of mechanical-cleaning equipment in the past several years has been better manpower utilization, in addition to outstanding improvements in coal quality. Cleaning nut coal, for example, by mechanical methods reduces impurities to a minimum and insures greater uniformity. It also can save in a single plant from two to four all the way up to twelve or more pickers,

depending upon tonnage and the magnitude of the picking job. In many cases sizes up to 6 or 8 in. also lend themselves to mechanical cleaning, with consequent conservation of manpower.

Hand-picking itself may be conducted to save materially in labor. One requisite is good lighting, which speeds the picking process and promotes efficient separation of refuse and coal. Study and experience have raised the standards in approximately the following steps: 2 to 5 foot-candles before World War I; 25 to 30 foot-candles in the 30's; 200 foot-candles in 1945. Proper design of tables has been found a good way to reduce picking labor as much as 50 percent or more, chiefly by shortening reach and eliminating lifting. Highest efficiency and best utilization normally result when a picker need not exceed his normal reach and when refuse can be slid rather than lifted off the table.

Even where mechanical equipment already is in service it is possible to achieve substantially better use of the manpower required. Operation at as near maximum capacity as possible means greater tonnage with the





same number of men. Uniform feed (from the standpoints of quantity, size and impurity content, within practicable limits) increases the production of the cleaning units and insures better cleaning results.

Efficient operation of equipment also conserves manpower and lowers cost. A high percentage of good coal in the reject means either recleaning or loss of the coal to the refuse pile and a reduction of the quantity against which labor cost can be charged. However, if existing equipment must be operated at greater-than-capacity rates or is inherently less efficient, the quantity of coal susceptible to salvage may warrant additional equipment and labor for re-treatment. The same reasoning also applies in the case of coal frequently rejected in the usual preparation processes (slurry, for example), coal dumped with mine rock, etc.

Maintenance of preparation plants often involves considerable expenditures for manpower and materials, aside from the cost of stoppages resulting from breakdowns. The remedies include good design and good materials, including steel, concrete, corrosion- and abrasion-resisting materials in tanks, bins, chutes, screens, pumps, valves, piping and the like; concrete, wood, brick, tile, glass and special metal or alloy chute and tank linings, conveyor bottoms, etc.; anti-friction and special under-water bearings, element-proof sheeting and siding, protection against freezing; dust- and moisture-proof electrical controls, circuits and motor equipment; design to reduce dust, spillage and clean-up labor; and regular inspection, cleanliness and good lubrication. Motor-operated bin gates; automatic samplers, sample splitters, power crushers and grinders and other mechanical facilities for sample collection and preparation, plus stoker-fired heating units and similar equipment, are other manpower savers in preparation.

#### Modern Refuse Disposal—Less Labor

The important end product of mining and preparation is marketable coal. There is one other, however—refuse, where the objective is to get it out of the way and into a convenient and satisfactory disposal area with a minimum of manpower and money. Modern means include the aerial tramway, self-dumping larry, belt conveyor and motor truck. Conditions at each operation

play a large part in the choice of equipment and all of them have places where they function best. As compared with old style methods, modern facilities save up to twelve or more men at the usual operations.

Rather simple steps can result in a substantial saving in refuse disposal. One mine reports that a flygate and bin were added to the preparation plant to permit dumping mine rock in the same trip as coal. This eliminated shifting cars out of trips, prevented tying cars up while waiting to dump rock and eliminated use of locomotives and crews for hauling rock cars to the dump. The new system involved one dump truck and three drivers, replacing two motormen and four helpers.

At another property track-disposal equipment was replaced by a truck saving the two men formerly required to install and maintain track. A 30-in. belt conveyor costing \$30,000 replaced track facilities at another property which required about 25 men for operation and maintenance. The belt reduced labor requirements to four men.

As with many other items of equipment, truck size also has a major bearing on manpower utilization. At one mine two large trucks replaced six small units in refuse disposal, with a saving of four men. A caterpillar truck at another plant is credited with a saving of six men in refuse disposal.

Equally large savings also have characterized a number of automatic aerial tramway installations, which are practically laborless. As an example, one mine was able to reduce manpower for disposal to one by a tramway, compared with an average of seven with the old track and dump system previously employed.

Larry installations include one where one motorman and seven other men were employed in the tippie, on track and on the dump in disposal with old small-capacity dump cars. With the larry, a three-way dumping unit supplemented by well-designed storage facilities with motor-operated gate, one man now is required for regular dumping.

At least one successful refuse-pumping system, involving preliminary crushing, mixing with water and handling in a special pumping unit, went into operation several years ago and several others have been scheduled in recent months.



# Manpower Opportunities

How coal can make better use of its manpower and thereby do a better war-production job while laying a firmer foundation for the future has been analyzed in some detail in the preceding pages in this issue of Coal Age. For the convenience of officials and operating men, these opportunities are summarized in the following mining-manpower score sheet.

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- ☐ Have the tonnage and cost possibilities of increased output per man-shift been fully explored? 74
- ☐ Have all possible measures been taken to promote attendance and reduce labor turnover? 76

## MECHANICAL MINING

- ☐ Have the manpower-saving and cost-reducing possibilities of loading machines, conveyors and other mechanical mining equipment been fully explored? 78
- ☐ Is retreat mining and concentration practiced to the fullest extent permitted under conditions prevailing at the mine? 79
- ☐ Does the working territory provide the machine with sufficient places for high tonnage? 81
- ☐ Are crews large enough to enable the machine to produce at its maximum rate? 81
- ☐ Are places driven as wide and deep as possible to increase loader output and efficiency? 82

## FACE PREPARATION

- ☐ Do cutters and drills have sufficient capacity to enable loaders to work at maximum rate? 83
- ☐ Has full advantage been taken of the time-saving possibilities of modern bits? 83
- ☐ Does shooting provide maximum loadability with a low cost for explosives and supplies? 84
- ☐ Is maximum use made of machinery in handling drawslate and partings at the face? 84

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- ☐ Are the cars in use the biggest that can be employed in the mine? 86
- ☐ Is the car-changing distance as short as it is practicable to make it? 88
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- ☐ Are modern haulage controls employed to conserve manpower and increase haulage capacity? 91

## POWER

- ☐ Have the possibilities of increased productivity through good face voltage been fully attained? 92
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- ☐ Has the d.c. system been checked to see if modern methods cannot raise face voltage? 93

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## MANPOWER OPPORTUNITIES (Continued)

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### MAINTENANCE

- ☐ Are trained men, modern maintenance methods and good records provided to keep equipment running? 94
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### VENTILATION

- ☐ Has a check been made to see if better air at the face will not raise individual productivity while insuring safer working conditions? 99
- ☐ Have the possibilities of machinery and modern methods to save manpower in establishing and conducting ventilation been fully explored? 100

### PUMPING AND DRAINAGE

- ☐ Has full advantage been taken of gravity to reduce manpower requirements in handling water and keep it out of the workings? 101
- ☐ Have modern pumping units and labor-saving controls been adopted to the maximum extent possible under prevailing conditions? 102

### SAFETY

- ☐ Have the effects of safety on individual productivity and mining cost been studied as a guide in attaining the maximum benefits? 103
- ☐ Has the safety program been organized to take advantage of modern equipment and methods for reducing injuries, property damage and loss of production? 103

### STRIPPING

- ☐ Have the most efficient methods and equipment been adopted for supplying electric power, handling water and maintaining equipment? 105
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- ☐ Are stripping and loading units accompanied by the proper auxiliaries and operated for maximum production of coal? 107
- ☐ Are big modern haulage units supplemented with good roads to conserve manpower and increase the output of the operation? 108

### PREPARATION

- ☐ Is mechanical cleaning employed to the fullest possible extent to conserve manpower and insure a quality product? 109
- ☐ Is equipment operated on the most efficient basis to assure maximum coal recovery? 109
- ☐ Are hand-picking methods designed to insure the most efficient use of manpower? 109
- ☐ Have the cost-saving and manpower-conserving possibilities of modern equipment for handling refuse been fully explored? 110



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# The Foremen's Forum

## Large vs. Small Sealed Areas For Extinguishment of Mine Fires

**To Subdue Mine Fires Speedily, Reduce "Inbreathing"—  
Big Inclosures Lower Sealing Temperatures, Thus Cutting  
Heat Drop, Saving Time and Excluding Fire-Reviving Air**

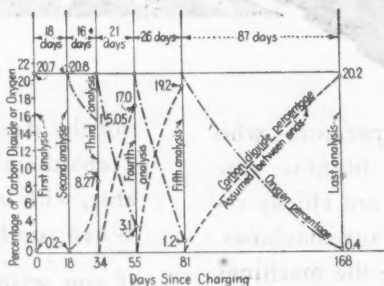
WHEN SEALING a fire, connection may be maintained or provided with several rooms, one or more goafs, or both, thus increasing the volume of the inclosed air. Is that a good objective in sealing or is it not?

In an earlier article, entitled "When Sealing a Mine Fire Should Inclosed Area Be Big or Small?" two of the advantages inherent in large sealed areas were stated. It was shown that in a large inclosure much of the area must be so old that its power to emit methane will have been greatly reduced and that much of that area will be delivering large quantities of carbon dioxide, for that is a characteristic of all coal when it has been exposed to the air for a long time. In consequence, a large area will be less likely than a small one to be involved in an explosion.

In that article it was shown also that the quantity of carbon dioxide emitted by crushed coal in a vacuum during the first six weeks of an experiment was much greater than in the second ten-week period, but that in the ten weeks that followed—the third period in the series—the quantity was almost equal to that emitted in the first six weeks. The suggestion was made that the carbon dioxide emitted in the last of the three periods was self-generated ("autogenetic"), but why should there not have been such self-generation in the two other periods? Probably because autogenesis does not operate when its end product (carbon dioxide) is already occupying all the interstices and crevices in the body of the coal. When the vacuum has removed this interstitial and the adsorbed

carbon dioxide, the generation of that gas slowly begins to reassert itself.

Evolution of carbon dioxide from rotting props also increases most rapidly after the passage of time, and oxygen percentage decreases at the same time, as the table, for oak sawdust, suggests. The figures in that table were taken from U. S. Bureau of Mines Bulletin 105, entitled "Black-damp in Mines." It should be noted that the material was sawdust, not props, and that the sawdust was wetted. Only the rotting times of the sawdust are expressed cumulatively. All the other figures are non-cumulative. In the last 87 days of bacterial fermentation, the sawdust converts fresh air to a mixture containing 20.2



Non-cumulative analyses exhibit how oak sawdust raises carbon dioxide and reduces oxygen percentage as time progresses (see table).

percent of carbon dioxide and 0.4 percent of oxygen.

It is evident that most of the carbon dioxide will be developed in the area of the goaf or gob where the props are oldest, and therefore when the air is stagnant, as in a sealed inclosure, will be found at a distance from the active or operating areas. It will be some time in reaching the fire area, and the same is true of the inert gas from the coal. One may wonder whether percentages taken at seals, usually low points, give satisfactory evidence of safety or danger, and whether the analyses of samples taken at high points are any

more dependable evidences of the true conditions.

Carbon dioxide tends to go to areas at low elevation and methane to areas at higher elevations, but neither tends to invade the fire area, usually in between. Yet it is the condition at the fire area that interests the man who has to combat the fire. The chemists who have to lay their bets on the analyses of the atmosphere at the seals are more likely to be wrong than right. Certainly, when gravity and time implications are given due consideration, the safety or danger of the operation is likely to be more fairly evaluated. Diffusion acts slowly in opposition to gravity.

### More Air, Weaker Damps

To the advantages of large areas already quoted two others may be added:

(c) **Largeness of Area Dwarfs Fire Gases**—As the explodable gases derived from the fire will be mixed in an extensive inclosure with a larger volume of air they therefore will be less dangerous than they would be in a more limited area. Before the fire is sealed, these damps were not explodable or they would have exploded. They had been generously diluted by the steady introduction of intake air. Now, with sealing, they are dependent on the air behind the seals.

The fire becomes cooled after the sealing. It produces less explosive gases but enough, of course, to be very dangerous if sufficient air is not present to dilute them and keep the explosive gas percentage below explosive limits, which limits will be raised in the presence of carbon dioxide and of excess nitrogen.

(d) **Largeness of Area Cools Condensable Gases**—With a large area, some few of the explosive vapors may drop as liquids and thus may reduce the hazard. The quantity, however, will be small—perhaps negligible. It has been stated that extremely fine droplets of water in the air will not freeze until a temperature of  $-20$  deg. F. is reached. There is a somewhat similar delay in the condensation of vapors. The vapors do not drop as soon as the normal liquefaction temperature is reached. We know that there is water vapor in the air even when that air is below the boiling point; so there is vapor of other gases in the air even after the temperature of the air falls below their boiling points.

For all the four reasons stated, a fire in a large sealed area will have a longer period of menace than a smaller area because it will be longer reaching its critical stage. It must be remembered that while the explosive gases of the fire are

### CARBON DIOXIDE AND OXYGEN IN AIR AFTER EXPOSURE TO OAK SAWDUST

	Carbon Dioxide	Oxygen
On charging.....	0.2	20.7
18 days from charging.....	8.27	15.05
34 days from charging.....	17.0	3.1
55 days from charging.....	19.2	1.2
168 days from charging.....	20.2	0.4

Water was added to each bottle 15 days after tests were started and just prior to these analyses.



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rendered less dangerous by a large inclosure, the extinctive gases of the fire are less effective by reason of that largeness.

All these are advantages based on the gas content of the atmosphere in the inclosure, but among the important advantages are those arising from a reduction in volume of the atmospheres "inbreathed" and "outbreathed" when the fire cools or grows warmer respectively. These latter are physical, not chemical, changes. The first three advantages already cited relate to the explosion hazard, the other advantages to the speed and certainty of fire extinction and only distantly to safety. The advantages may be thus cited:

(d) **Largeness of Area Dwarfs Heat of Fire**—Given a sealed heat source, such as a mine fire, of definite proportions independent of the size of the sealed area, the air in a large inclosure will have a lower average temperature than the air in a small one. Note the reference to average temperature. The mixing always is so incomplete that the average temperature is never the temperature of any large part of the area but the aggregate expansion will be governed by the average temperature nevertheless. In a large area, some parts will never be affected by the heat of the fire. This lower average temperature is in itself a gain, because: (1) A reduction of temperature must be one of the aims in fire extinguishment, though the smothering of the fire is, at least at first, the major consideration. (2) Lowering the temperature shortens the time needed to bring the coal around the fire to a temperature at which it will not revive if air is admitted, and (3) a lower temperature serves, as is about to be explained, to make the extinguishment steady and unbroken by periods of revival.

#### Narrow Heat Range Helps

The reduction of temperature has an importance as a means of smothering the flame, for when the range through which the heat has to be reduced is narrowed, there will be a smaller contraction of the sealed atmosphere and less air will leak into the inclosure through the stoppings. However, the change in volume for any degree of heat reduction or increase increases proportionately to the increase in area; therefore the large area will make less difference in the shrinkage or expansion than might be expected, as will be seen later.

Let us try figures again to bring the problem down to earth. If the average temperature in an inclosure at sealing is 200 deg. F., the so-called absolute temperature will be  $460 + 200 = 660$  deg. F. If, when the seals are opened, the temperature is 80 deg. F., the absolute temperature will be  $460 + 80 = 540$  deg. F. The atmosphere behind the seals will contract in proportion to the absolute temperatures at the time of sealing and the removal of the seals respectively, or  $\frac{540}{660} = 0.8181$  or 81.81 percent.

The quantity of atmosphere that would enter to fill the vacuity, if it is allowed to enter, therefore would be 18.19 percent of the volume of the inclosure.

As soon as the seals are completed, the

fire will burn less vigorously, but, as all the products thereafter will remain within the inclosure, the heat in the air will not decrease as rapidly as the heat of the fire. But it will decrease, because the hot air from round the fire will leave its former course and travel to the high points in the inclosure where the coal is cool and has been hitherto unaffected chemically by the heat. The coal takes up heat rapidly because of the great difference in temperature and because of the endothermic (heat-absorbing) reactions in the coal when first heated. Thus, the pressure on the seals is considerable. Probably at no time is the inbreathing so active as soon after sealing.

#### 74-In. Water Gage

So long as the temperature is constant, the pressure X volume will be a constant. The volume at atmospheric pressure at the time of unsealing would be 0.8181 X, if X is the original volume, but if, because of the tightness of the seals, etc., this atmosphere is occupying as much space as if still at 200 deg. (that is, if it is still occupying the entire volume of the inclosure), the pressure will drop in the proportion of 0.8181:1 = 1:1.2222.

To simplify matters, the atmospheric pressure will be assumed as the average at sea level—namely 14.7 lb. per square inch. Pressure then will be  $14.7 \times 0.8181 = 12.03$  lb. per square inch, a fall of 2.67 lb. per square inch = 384.48 lb. per square foot = 73.94 in. water gage.

With such a water gage almost anything can happen. One cannot hope to prevent much of the leakage, and even pillars of coal will be by no means immune. There is, of course, no such water gage actually present at any time, for the seals or pillars are sure to leak long before it is reached, and then the pressure will decline.

In this calculation, no note has been taken, or need be taken, of the size of the inclosure. The change of pressure and the difference between internal pressure within the inclosure and the external pressure without it will be the same in either case, provided the average temperature has the same range, as in this example, from 200 to 80 deg. F. That drop will determine the pressure. A big difference, however, will arise if the average temperature of the inclosure is decreased by an enlargement of the area inclosed.

#### Effect of Enlargement

Supposing that the normal mine temperature before the fire started was 60 deg. F., then the fire in the example considered will have raised the temperature  $200 - 60 = 140$  deg. F. If the inclosure is made four times as large in cubic feet as was originally planned, then the temperature will be  $60 + (140 \div 4) = 60 + 35 = 95$  deg. F.

Accordingly volume X will be reduced to:

$$\frac{460 + 80}{460 + 95} X = \frac{540}{555} X = 0.97297 X$$

$$= 97.297 \text{ percent of } X$$

$$\text{and Volume } Y = \frac{1}{0.97297} X = 1.0277 X$$

Pressure, if there is no leakage, would be:

$$= 14.7 \times 0.97297$$

$$= 14.303 \text{ lb. per square inch}$$

$$\text{Pressure difference} = 0.397 \text{ lb. per square inch}$$

$$= 57.168 \text{ lb. per square foot}$$

$$= 10.99 \text{ in. gage}$$

Comparing 73.92 with 10.99-in. water gage, one can see a big improvement in conditions resulting from a quadrupling of the volume. In the one case the quantity of reduction is  $100 - 81.81 = 18.19$  percent and in the other case  $100 - 97.30 = 2.70$  percent; so by the quadrupling of the area, the quantity of air that will enter if the seals are not tight will be only about 15 percent what it would be with the smaller area.

Other advantages are:

(e) **Largeness of area makes it possible to control the incoming pressure-restoring medium** so that all will enter: (1) at points remote from the area of disturbance around the fire, which is an advantage, because any medium entering at points near the fire inevitably would mix with the gases as a result of their movement and thus would reach the fire itself; (2) at a point or points behind the body of inert gas in the inclosure, and (3) at points as remote from the fire as possible.

(f) **Largeness of area makes it possible to use air or other pressure-restoring mediums that otherwise would be undesirable.** These considerations, however, must be discussed in a later article.

## Too Much Anxiety May Injure, Not Help

When a man has had an accident, the first impulse is to ask him: "Are you hurt much?" and when he says "No" to interrogate him further: "Is your leg broken?" Having received the same answer to this question, the questioner concludes there is nothing much wrong with the patient and proceeds to take hold of his arm and help him to walk over to the nearest place of safety, and to this he may not object, for he has a certain numbness that keeps him from realizing his true condition.

He is up now, and if he shows signs of pain, it may seem best to persevere and "walk" him farther for the objective point is only "just a little way farther". He has said there is nothing much amiss with him, but he probably has been shocked and that condition may develop rapidly or may be delayed and may take some hours to manifest itself. So such "walking" of a patient even a short distance is considered bad practice. The patient has no idea what is wrong with him, so he cannot tell anyone, nor can the solicitous friend tell from an exterior examination. So it would be best to make him safe with as little and as easy movement as possible until the arrival of a physician. First-aid treatment may mean in this instance only placing the injured person carefully on a stretcher and removing him from the mine. To induce him to walk would be dangerous and might greatly complicate his "internal injuries."

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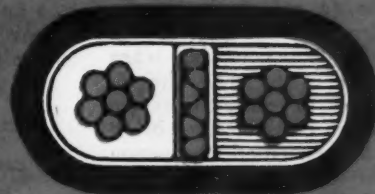
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# State-Board Questions

## State Mine Inspectors, Illinois

### Air Volume in Passage

Q.—In an airway 7 ft. 6 in. high, 8 ft. wide at the top and 9 ft. 6 in. at the bottom, the anemometer reads 350 r.p.m. What volume of air is passing?

A.—The mean width of the airway is  $\frac{1}{2}(8 + 9\frac{1}{2})$  ft. =  $8\frac{1}{4}$  ft. and the cross-sectional area is  $7\frac{1}{2} \times 8\frac{1}{4} = 65\frac{1}{2}$  sq.ft. The volume of air passing therefore is  $65\frac{1}{2} \times 350 = 22,968 +$  cu.ft. per minute on the assumption that the anemometer records a revolution for every foot of velocity per minute, which is the general setting for such instruments.

### Mine Gases

Q.—Name and describe the gases commonly found in coal mines. How dangerous are they to life and what are their effects on man? Give also their symbols, specific gravities and properties. In what parts of the mine are they found? How are they produced? Describe their effects on combustion.

A.—Methane ( $\text{CH}_4$ ) is sometimes termed marsh gas, but some gas emanating from marshes glows in the dark, and there is no reason to believe that methane ever does that. Such marsh gas probably is methane with minute irradiated particles of calcium sulphide suspended in it. The specific gravity of methane is 0.5543; thus methane is just about half as heavy as air, the specific gravity of which is taken as 1.000, all the specific gravities of gases being compared with air as a base (the specific gravities in this answer are based on U. S. Bureau of Mines, I.C. 6983 p. 1). Methane is colorless, odorless and tasteless. It is said sometimes to have a sweet taste, but that is due to the presence of impurities, perhaps pentane (a gas of the paraffin series) or ethylene (olefiant gas).

Methane is not poisonous, but when sufficient methane is present, with or without other gases, to reduce the oxygen percentage in the air being breathed below that necessary for respiration, the person trying to breathe such an atmosphere suffocates. That is true of many gases, but of most gases it is never stated, solely because they are never naturally present in the needed quantity to deplete the oxygen in the air sufficiently to exhibit that phenomenon. Many also are so poisonous that quantities sufficient to produce suffocation would destroy life by poisoning more suddenly and effectively than by the deprivation of oxygen.

Methane is a highly explosive gas, but when it constitutes as much as 15 percent or more of a mixture with normal air, this gas will not carry flame from one point to another and thus will not explode. With so much methane, even the flame cannot breathe freely. There is, in short, a flameless or near flameless combustion. Such a combustion occurs when there is too little or too much air present for flaming combustion.

Being lighter than air, methane accumulates at the roof, also in its crevices, in recesses resulting from chunks of rock falling from the mine roof, at the tops of steep pitches and in rise workings without a vent to let the methane pass to higher levels; there it often may be found in large quantities. Sometimes, however, it occurs in places in the floor of the coal bed, and when the rock is broken the methane will come out in quantity.

In one mine, methane in a floor crevice, or "blister," was believed to have been released when the weight of a passing locomotive broke the blister. The gas released caught fire, and a disaster resulted. In some flooded sections of mines, methane can be observed escaping in a train of bubbles through the mine water. Flooding of mine areas in pitching beds may drive the methane through the intervening rock between the beds and, at times, though rarely, it may escape from natural rock reservoirs in such quantities as to make mining impossible until the pressure of such a "blower" is greatly reduced.

Methane is being, or possibly, should we say, has been produced by a slow rearrangement of the atoms of carbonaceous materials (metamorphosis). It is a question whether the methane now present in coal has been recently formed or is attributable to a far earlier metamorphosis when conditions were more favorable for such a change than they are today.

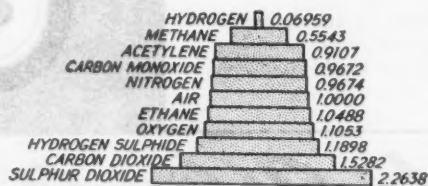


Fig. 1—Specific gravities of some mine gases. Those at the top are found near the roof. The three at the bottom stay near the floor, but they all dissolve very readily in water.

### Carbon Dioxide

Carbon dioxide ( $\text{CO}_2$ ), specific gravity 1.5282, is a gas that extinguishes life and flame. It is colorless, odorless and tasteless, but, when dissolved in water, it has a slight acid taste. Being a half heavier than air and almost three times as heavy as methane, it accumulates on and near the mine floor, in low places, where often both carbon dioxide and water congregate and in dip workings where there is no lower outlet.

It is produced by combustion, as in mine fires and explosions, and also in the tissues of men and animals, by a reaction between the oxygen which the iron in the hemoglobin of the blood carries and the carbonaceous materials in the body with which the blood in its circulation comes in contact. The carbon dioxide thus formed is discharged by the lungs into the air. The air received by the lungs has about 0.04 percent of carbon dioxide, and it leaves with 4.38 percent. The lungs get credit for turning the trick, but that legerdemain is performed by the tissues of the entire body rather than by the lungs. The lungs merely handle the primary material, which is the air, and the product, which is the carbon dioxide. The lung is not a producer of carbon dioxide; it is merely a collector and distributor—a middleman.

Other sources of carbon dioxide are the oxidation of coal, the burning of oil in lamps and the burning of methane by the oil flame of lamps, the combustion of explosives, chemical action of acid waters on limestone, the metamorphism of coal and the rotting of timber. Carbon dioxide is not as great a menace to human life in the mines as usually has been thought. Suffocation usually occurs because the air has lost its oxygen, so essential a constituent of breathable air. This air is thus left with too high a percentage of nitrogen and carbon dioxide. This combination acts much in the same manner as was explained to be the action of methane, though carbon dioxide has a somewhat more active effect than nitrogen, perhaps because it is heavy and so blankets the flame.

### Hydrogen Sulphide

Hydrogen sulphide, ( $\text{H}_2\text{S}$ ), has a specific gravity of 1.1898. Probably no one in a coal mine was ever killed by this gas, yet it is very poisonous. It has the odor of rotten eggs, but when it is in higher concentrations, such as one is unlikely to find in the mines, it paralyzes the organs of smell, and then its presence cannot be



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# **SUN INDUSTRIAL PRODUCTS**

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detected by its odor. Prolonged exposure to concentrations of 0.005 to 0.010 percent will cause conjunctivitis (gas eyes) and 0.06 to 0.10 percent will immediately make the victim cease breathing and death will follow, unless the person is promptly removed and resuscitated (see *Coal Age*, December, 1940, p. 71).

This gas explodes with air in concentrations ranging from 4.3 percent to 46 percent. Explosive quantities of this gas, however, are not to be expected in coal mines. It is formed in explosions, in mine fires, in blasting, and occasionally it escapes from waters in which it has been dissolved.

The examiners probably do not desire information regarding gases in normal air—oxygen, nitrogen, argon, helium, neon, krypton and xenon. There are, however, other gases, the outcome of disasters, shooting, lighting, mine drainage, and the escape of gas from oil or gas wells or oily measures that demand discussion. Principal of these gases is carbon monoxide, yet, unusual as is its appearance in appreciable quantity, when it thus occurs its action is most disastrous.

### Carbon Monoxide

Carbon monoxide (CO), a colorless, odorless and tasteless gas, is the outcome of the burning of coal or methane with insufficient air or of the passage of carbon dioxide through burning coal, in which case the coal takes some of the oxygen from the carbon dioxide, thus converting it to the more dangerous gas, carbon monoxide. Thus, it invariably occurs in mine fires and explosions, and is responsible for more deaths than any other mine gas.

In the presence of wet coal and air, the carbon monoxide will be slowly converted back to carbon dioxide. Carbon monoxide is generated also by the imperfect combustion of explosives in blasting and by incomplete combustion in the cylinders of internal-combustion engines. Its occurrence in the mines is accompanied with a distinct odor, but this again must be attributed to impurities of many kinds.

Carbon monoxide has a specific gravity of 0.9672, almost that of nitrogen, which is 0.9674, and near that of air, which is 1.0000. So carbon monoxide does not rise like methane or fall like carbon dioxide. It comports itself like air. It explodes in air over a range running from 12.5 to 74 percent; not, however, with much violence, as there is not as much heat generated in this second phase of combustion from carbon monoxide to carbon dioxide as is generated when the two phases are combined and the big jump is made from carbon to carbon dioxide. Besides, when compared with methane, it has no hydrogen, which is a hotter combustible than carbon, and it seems to be a little too slow in action to make a violent explosion. Carbon monoxide burns with a blue flame, for it has no particles of carbon in suspension to give a brilliant incandescence.

### Ethane

Ethane (C<sub>2</sub>H<sub>6</sub>), odorless, colorless and tasteless gas with specific gravity 1.0488, is difficult to differentiate from methane

when there is much methane and little ethane in a mixture. There may be more of it in normal mine air than we think. That applies to all the hydrocarbons except methane. Moreover, chemists usually do not try to determine the quantity of ethane. When present in quantity, it generally indicates that natural gas from gas and oil wells is entering the mines through crevices in roof, coal or floor, probably due to the "capping" of such wells or to their imperfect "plugging," and

to the tremendous pressures of such gas. Like a number of other hydrocarbons, it may originate, however, in "oil seeps" from overlying or underlying strata. It is a "quick gas," meaning that it explodes at a low concentration, the lower limit being 3.2 percent only and the upper limit 12.5 percent.

[There are other gases, and some of these will be discussed in a later issue, with diagrams showing the lower and upper limits within which combustible gases explode.]

## Bituminous Mine Electricians, Penna.

Q—When the voltage in a circuit is doubled, what reduction can be made in the size of the transmission wire if the power to be delivered and the distance to be traversed is unchanged?

A—If the voltage in a circuit is doubled the diameter of the conductor can be cut to one-fourth, for the cross-section and carrying capacity of the wire is increased or decreased in accord with the square of the diameter.

Q—A motor receives a 100-amp. current and is 1,000 ft. from the power source, which enters the line at 250 volts. If we wish to limit the voltage drop to 10 percent what should be the number of circular mils in the transmission wire?

A—Ten percent of 250 volts is 25 volts. The number of circular mils should be:

$$\frac{\text{Amperes} \times \text{distance to motor and} \times R}{\text{Voltage drop}}$$

R being the specific resistance of the conductor which for copper is 10.4 ohms per circular-mil foot

$$= \frac{100 \times 2000 \times 10.4}{25} = 83,200 \text{ cir.mil}$$

It might be well to detail the background for this calculation so that the reader need not commit the preliminary rule to an uncertain memory, and will be able if he does remember it to check the accuracy of his recollection. The basal rule for electrical problems is that the current flowing is proportional to the potential and inversely proportional to the resistance.

That is  $I = \frac{E}{R}$  where  $I$  is the intensity

of current, or amperes;  $E$  is the potential, or volts, and  $R$  is the resistance, or ohms.

The resistance also, as might be expected, is proportional to the distance the current has to travel and is inversely proportional to the cross section of the wire or number of circular mils, but here we are facing a difficulty, for we are dealing with physical relations and not with quantities that electrical engineers have arbitrarily related to each other by definition, as they have amperes, volts and ohms. In fact, there usually are no real definitions of these quantities; only statements regarding their relation to each other.

We now get where the relations are not made by word makers but are determined by physical experiments.

This preamble introduces  $k$ , the coefficient or multiplier that relates resistance to the length of the conductor and to its cross-section. The resistance always is proportional to the length of the conductor and inversely proportional to its cross-section, as seems quite reasonable.  $R$ , the resistance, accordingly must be proportional to the length divided by

the cross-section  $= \frac{l}{a}$ . But this resist-

ance varies with the material and, for copper, it is found that  $k = 10.4$  ohms, when the length is one foot and the cross-section is 1 cir.mil. In other words the coefficient  $k$  shows the number of ohms of resistance in circular-mil feet. Thus Resistance  $R$  in ohms

$$= k \times \frac{\text{length in feet}}{\text{cross-section in circular mils}}$$

$$= 10.4 \times \frac{2,000}{a}$$

$$I = \frac{E}{R} = \frac{E}{\frac{2,000 \times 10.4}{a}} = \frac{Ea}{2,000 \times 10.4}$$

$$\text{So } \frac{Ea}{2,000 \times 10.4} = I = 100$$

For  $I$  in the problem is 100 amp.

In this case we take  $E$  to be only 25 volts, for that is to be the actual, not percentage, drop in voltage consequent on using a wire of a number of circular mils as yet to be calculated; so  $E = 25$ , not 250. We don't want to know the size of conductor that will be needed with a drop of 250 volts, but the size that will be needed for a 25-volt drop.

$$\frac{25a}{2,000 \times 10.4} = 100$$

$$\text{So } 25a = 100 \times 2,000 \times 10.4$$

$$\text{and } a = \frac{100 \times 2,000 \times 10.4}{25}$$

which is the same equation as presented in the foregoing column.

Of course, we might give  $I = \frac{E}{R}$  a

coefficient and write it  $I = k \frac{E}{R}$  but it has been cleverly arranged that  $k$  in that equation always is one and so it can be forgotten. If you want to recall the equation,

it can be written  $a = \frac{Ilk}{v}$  and "Ilk" can be recalled as the Scottish word meaning "the same."





Mine car troubles stopped years ago when Milburn By-Products Coal Co., Milburn, W. Va. threw out the bearings they were using and standardized on Timken Bearings! Today they are so enthusiastic about Timken Bearing performance they refuse to accept any other make and they are operating more than 400 "Timken Bearing Equipped" cars built by the Kanawha Manufacturing Co., Charleston, W. Va. with gratifying results.

But this is not an unusual case history... It is typical of the experience of more than 1,000 mine operators who demanded "All there is in bearings" and collectively operate in excess of a half million mine cars—all rolling on Timken Bearings.

All of them found it pays to put their rolling stock on Timken Bearings because they enjoy anti-friction advantages in full, including maximum train operating speeds to and from the tippie, heavier loads hauled without increased power, simplified and economical lubrication and more cars in service with less in the repair shop.

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# Operating Ideas

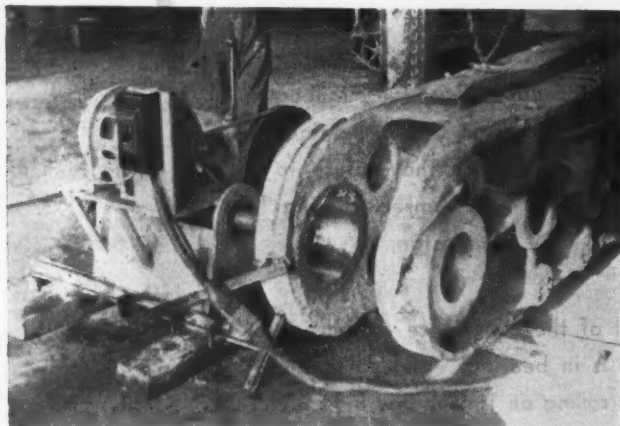
## Boring Rig Speeds Repairs to Strip Shovel

CONFRONTED with making repairs to strip-ping equipment too cumbersome to be moved to distant shops prepared to do such work, the Sentry Coal Mining Co., Madisonville, Ky., constructed a portable boring rig to do the work.

This efficient machine tool, shown in the accompanying illustrations, was built from scrap and parts picked up around the mine. A squirrel-cage motor drives an automobile gear shift through V-belts. The gear shift drives the ball-bearing-mounted boring bar by chain and the boring bar drives the feed mechanism through a set of feed gears from a discarded lathe. The final speed reduction is through a worm gear driving a spur gear that engages in a rack welded to the bedplate. The rack too is from an old lathe. Mounted on the end of the boring bar is a disk to which the boring tool is bolted. As the work progresses the whole machine moves along its bedplate to feed the tool to the work. Discarded ball bearings, about 3 in. in diameter, are the wheels upon which the machine is moved about the shop.



Details of boring rig. It is fastened to the part being worked on by welding.



Left: How the boring rig appears when set up for work. Right: A V-belt, chain and sprockets, and gears are used in the drive train of the shop-made boring, etc.

## Sectionalizing Hydraulic Lines a Saving

DIVIDING long hose runs in the hydraulic system of a loader into two sections takes less time and less hose when replacements are necessary, writes Peter J. Bogus, mechanic, Clyde No. 1 mine, Republic Steel Corp., Brownsville, Pa.

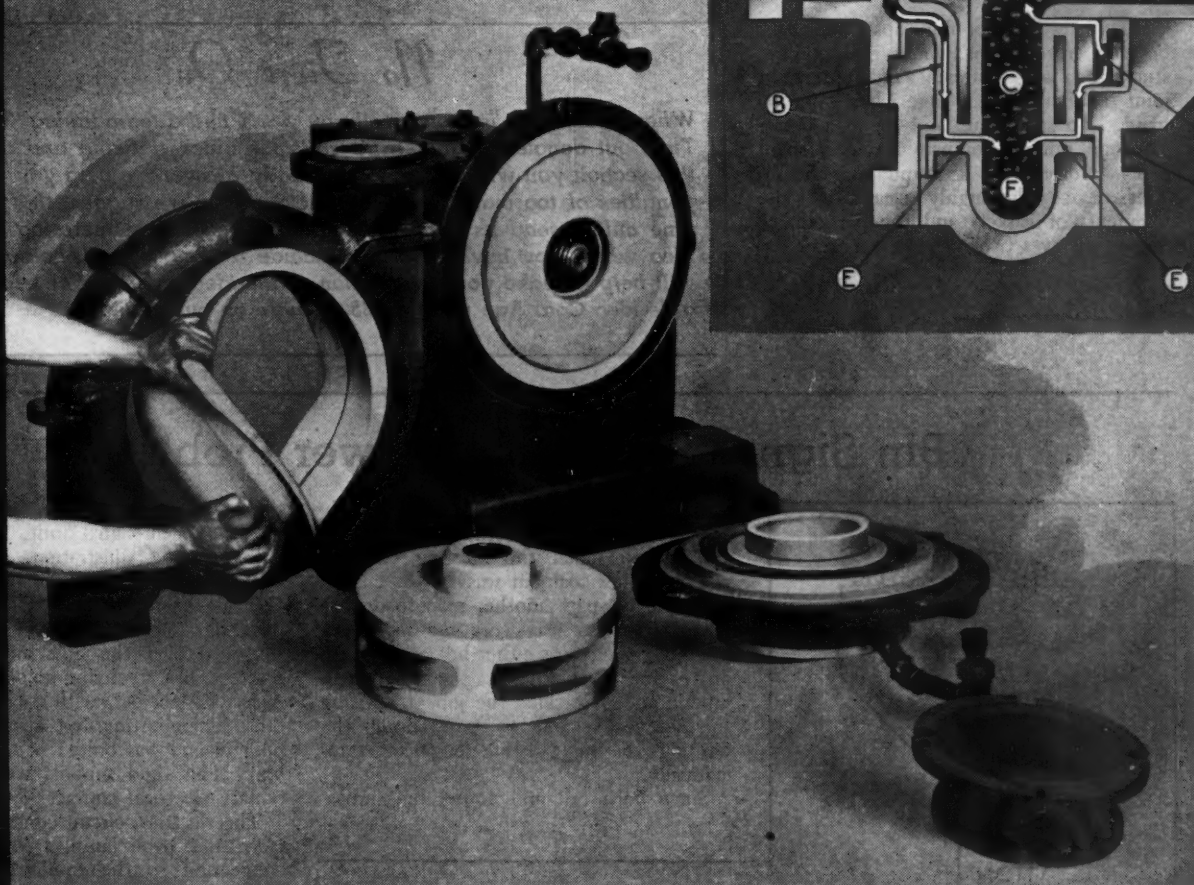
The hose runs to the raising cylinder on the front head and front conveyor clutches

on the Jeffrey L 600 loader are about 12 or 13 ft. long. A hole generally wears in the hose line where it makes a bend at the frame to go underneath to the front of the machine.

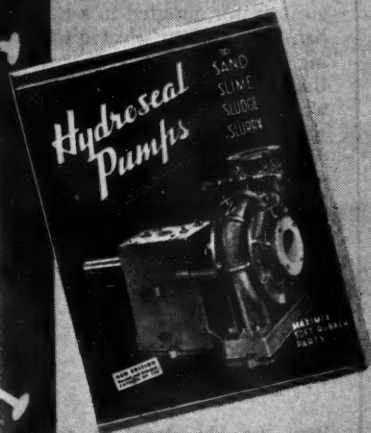
While the loader is over the pit in the shop, says Mr. Bogus, each hose line is replaced with a 3-ft. section (next to the

controls) and a 9- or 10-ft. section coupled together. A special guard holds the hose line in place at this coupling point, which is half way across the loader. When replacements are necessary the 3-ft. section (the section usually the first to go bad) can be quickly changed. This revision saves time and material.

# Down to Brass Tacks about why You Should Buy HYDROSEALS



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## Welding Postpones Clutch Replacement

SQUARING THE JAWS of the sheave wheel clutch driving the cable reel of a Jeffrey 29 C cutting machine by welding delays the replacement of parts by as much as 2½ months, writes Peter J. Bogus, mechanic, Clyde No. 1 mine, Republic Steel Corp., Brownsville, Pa. The jaws on the

sheave side become rounded and permit the clutch to kick out while it is supposed to be engaged. When this happens the trailing cable usually gets run over.

By building up the jaws with a bonding machine and squaring the surface with a cold chisel as much as 2½ months more of

service is obtained from the clutch. This eliminates opening up the transmission case at this time. Later on, when it is necessary to open the transmission, the clutch parts are replaced. Taking the transmission case apart, says Mr. Bogus, requires 2½ to 3 hours' work.

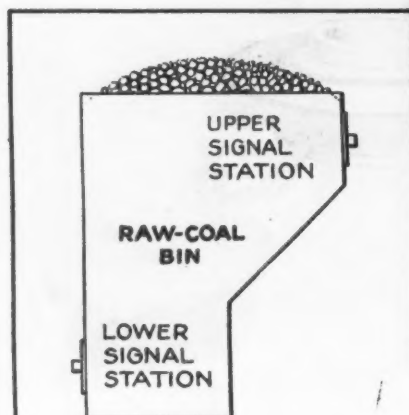
## Motorized Brush Cleans Boiler-Flue Caps

CLEANING water-tube flue caps which have become corroded or where gaskets have stuck to make a steam- and watertight joint requires a lot of time when done by hand. To save time, and to do a better job, one mining company fitted a small bench motor with a round wire brush. This device thoroughly cleans off the fragments of gaskets and the particles of rust—and saves two man-shifts a week.

### No Time Out

*When everything is going well you won't find a team taking "time out." Time out denotes trouble—and calls for quick thinking and action. In this section you will find a host of ready answers to help you avoid the penalties of too many time-outs. Incidentally, we suggest that you take time out to send us a new electrical, mechanical, operating or safety idea which you have at work. Include a sketch or a photograph if it will help to make your description of the idea clearer. For each acceptable idea Coal Age will pay \$5 or more on publication.*

## Bin Signal Solves Manpower Problem



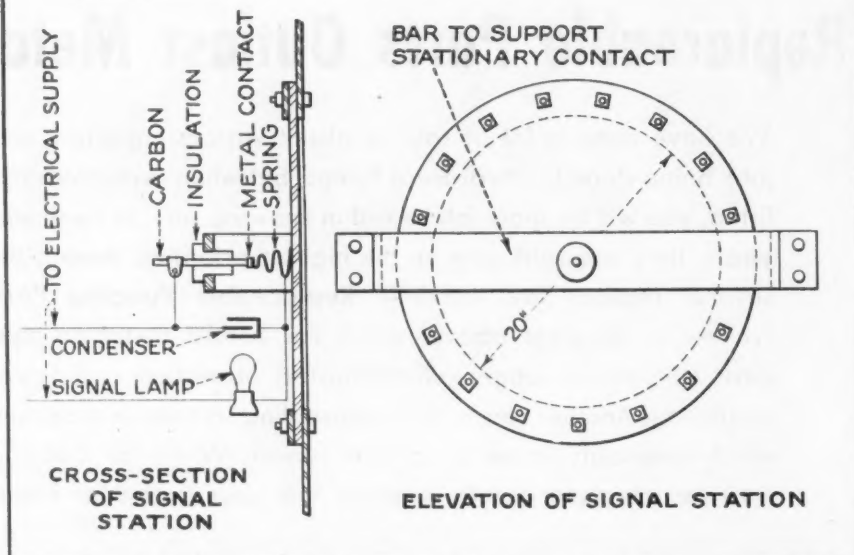
A LARGE MINE using a skip hoist recently had a man called into the service whose job was to signal the hoisting engineer when the raw-coal bin was full or empty. Not able to spare another man to do the job, which also was work no one really wanted, since it was either hot or cold and dusty and disagreeable, the company's superintendent tackled the job of devising an electrical signal to pass along the warning to the hoisting engineer automatically.

Since both full and empty bin indica-

tions were necessary, two signal units were needed. Each signal unit, shown in the accompanying illustration, was made as follows: A 20-in.-diameter hole was cut in the side of the bin at each location. A diaphragm of heavy conveyor belting was stretched over the hole and clamped in place with a steel ring and through bolts. A heavy steel bar, with each end bent to form a supporting leg, spanned the diaphragm and was bolted to the side of the bin. This rigid support was for the stationary electrical contact.

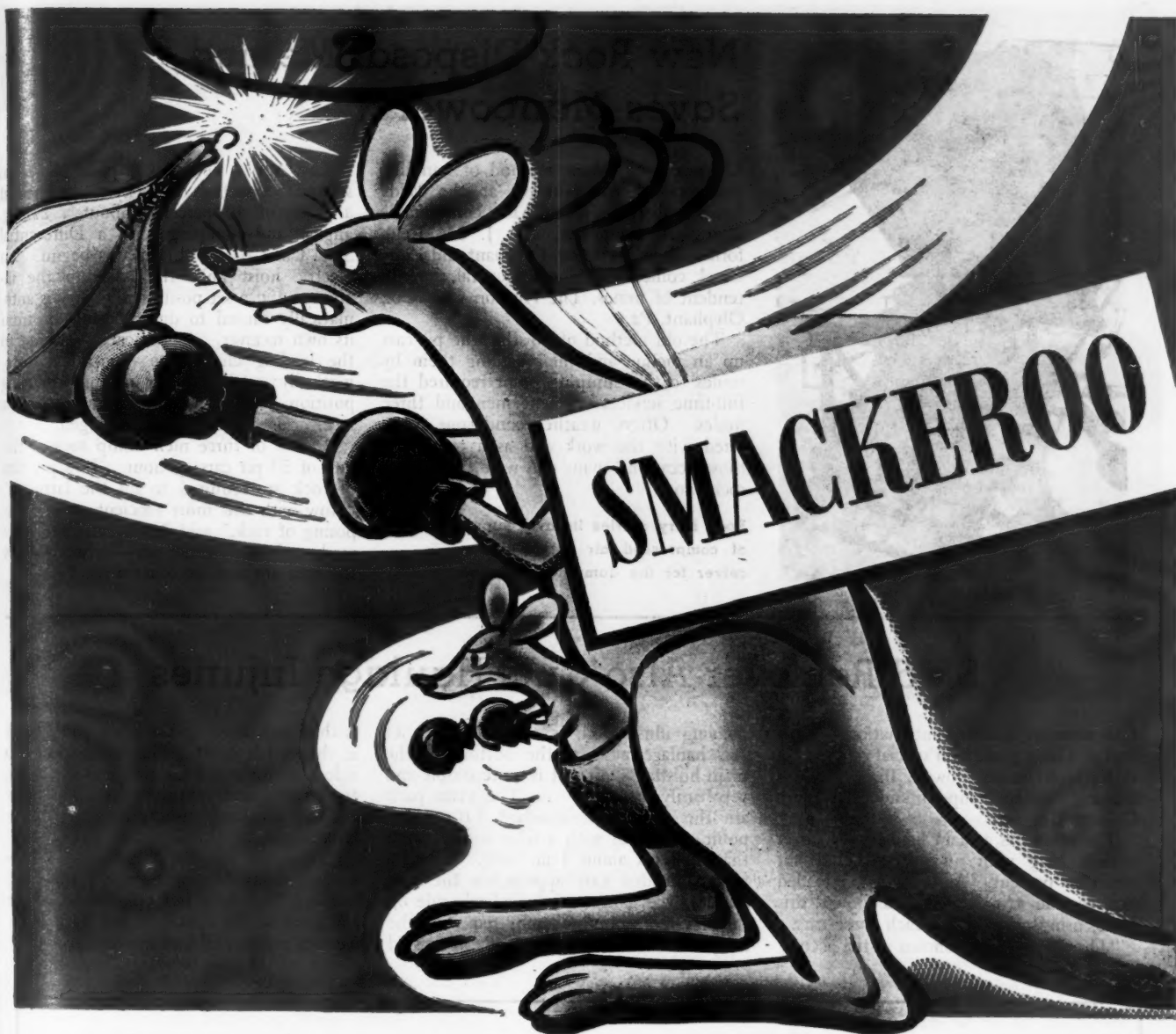
The electrical circuit consists of the contacts, a 250-volt lamp, a condenser and a connection to the tippie supply circuit. The movable contact made of metal and mounted on a spiral spring is attached to the center of the diaphragm. The spring permits the coal to push the diaphragm out without damaging the contacts. The stationary contact is a carbon rod, mounted in an insulator, inserted in a hole in the steel bar. Carbon was selected to prevent burning of the contacts. A trial proved that the d.c. arc persisted across a wide gap when the contacts were separated. A small condenser, connected in parallel with the contacts, solved the problem.

This device has proved to be a trouble-free coal-bin signal.



How the bin signal is constructed and wired to operate the indicating light.





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## New Rock-Disposal Method Saves Manpower

CHANGING to a new method of handling the rock-disposal problem at the Eddy Creek colliery has resulted in a considerable saving of manpower, says J. M. Reid, former superintendent, Olyphant and Eddy Creek collieries, and now general superintendent of mines, The Hudson Coal Co., Olyphant, Pa.

The old method of hoisting the pit cars up an incline and then hauling them by mules to the dumping point required the full-time services of eight men and three mules. Often, weather conditions interfered with the work and as a result, on those occasions, many cars were tied up for rock work.

Rock larry carries its own supply of compressed air in an air receiver for the dumping operation.

Last April a new rock-disposal plant was started. A section of track was inclined at a grade of 40 percent (about a 22-deg. angle) and dumping with a Differential Steel Car Co. 3-way larry was begun. An electric hoist pulls the larry up the incline and at a set position the larry is automatically caused to dump, using air from its own receiver. As the car is lowered to the loading chute, the dump bed automatically settles back in the traveling position. At the loading chute, the air receiver is automatically recharged.

A crew of three men dump rock at the rate of 50 pit cars an hour. Two pit cars of rock are required to fill the larry car. "Now with this more efficient way of disposing of rock," said Mr. Reid, "the crew works only every other day—between times the men are used on other work."

## Skid Remover Also Cuts Haulage Injuries

CAR SKIDS are removed automatically at the foot of a long grade by a special skid ejector at Kathleen mine, Dowell, Ill., writes Ed Leming, general superintendent, Union Colliery Co.

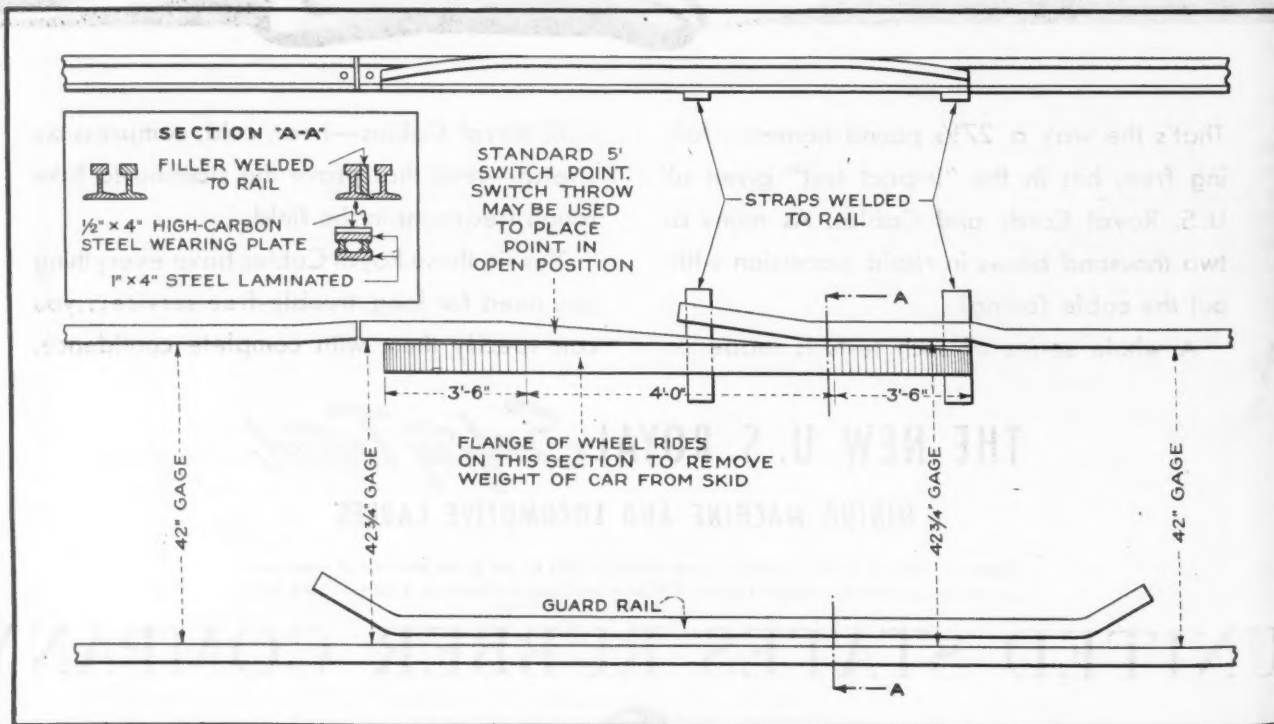
The mine has a main haulage road over a mile long with an average grade of around 6 percent. As many as 33 loaded cars to the trip are hauled down this grade, using one skid for each three cars.

"The skid remover, shown in the accom-

panying illustration, is at the bottom of this haulageway near the bottom of the main hoisting shaft. It is quite simple and very easily installed. . . . The main parts are the guard rail, standard 5-ft. switch point and a rail with a filler welded to it that makes it about 4 in. wide. When a trip of loaded cars approaches the skid remover the flanges of the wheels ride on the elevated section, thereby removing the weight of the car from the skid. The skid

is then moved along the track and ejected at the switch point. The car continues to ride the high rail, settles down on the track again, and continues on. This saves the stopping and pushing back of trips to remove skids.

"Since the installation of this skid remover about ten years ago," says Mr. Leming, "we have not only increased the efficiency of the operation but have eliminated a number of haulage injuries."



How the skid remover is constructed and installed.

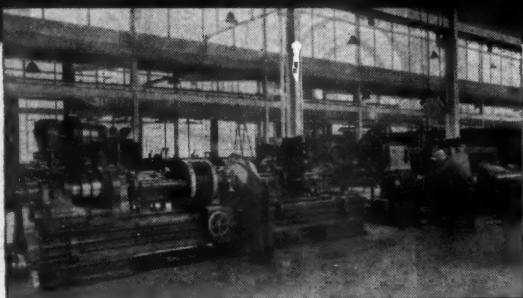
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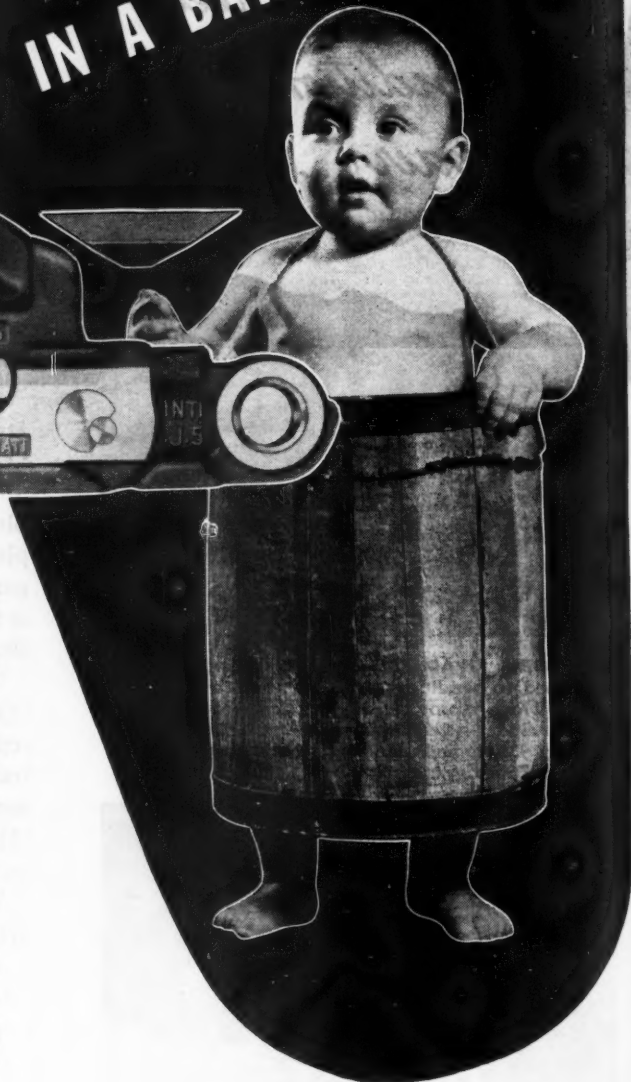
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# News Round-Up

## Bituminous Contract Agreed On; Some Work Stoppages Continue

AFTER six weeks of negotiations, bituminous coal operators and the United Mine Workers of America signed a new agreement April 11 calling for increases in basic earnings estimated by the operators at an average of \$1.25 to \$1.30 per day; coal costs, they figured, would be increased about 25c. a ton.

The increased payment for travel and luncheon time is \$6.44 for a six-day week, or \$1.07 a day, and differentials of 4c. an hour for the second shift and 6c. an hour for the third shift were added, with the annual vacation payment raised from \$50 to \$75. John L. Lewis, U.M.W. president, withdrew his demands for a royalty of 10c. a ton, for including most foremen under the union shop clause, and several items relating to wages and working conditions. The full agreement is given at the end of this news report.

### WLB Approves Agreement

The War Labor Board unanimously approved the agreement April 23. It estimated the increase in earnings at \$1.02 a day for a six-day week, including second- and third-shift premium pay and larger vacation payment. Noting that no general increase in hourly rates was called for, Chairman George W. Taylor, in a formal opinion approved unanimously by the board, stated that the board found the wage provisions within the limits of the national stabilization policy.

A major part of the increase in earnings—\$1c. a day for all miners—stems from full payment for portal-to-portal travel time, approval of this being based by the board on a U. S. Circuit Court of Appeals interpretation that underground travel time is compensable as work time.

The agreement also was approved April 30 by Director of Economic Stabilization Davis, who authorized OPA to increase price ceilings an average of 16c. per ton for the industry as a whole. OPA had placed the cost increase growing out of the new contract at slightly over 21c. per ton. However, OPA and Director Davis, using the OPA formula on profit margins (15c., or 1942 margin), directed that the industry absorb an average of 5c. per ton, making the net increase approximately 16c. Lewis immediately ordered the miners to continue work, but nevertheless, because of alleged failure to receive the order or dissatisfaction with the new con-

tract, a number of operations, in western Pennsylvania and elsewhere were shut down in the early days of May.

Permission sought by the Operators' Negotiating Committee to increase pay for employees in and around the mines whose compensation is under the jurisdiction of NWLB but who are not covered by the union contract has been approved by the board.

With the threat of a general strike averted for at least 30 days as a result of John L. Lewis' agreeing to have the miners work while negotiations continued, meetings were resumed April 2 in a more confident atmosphere, and continued daily until a deadlock was reached April 6. The operators and miners said they would appear before the War Labor Board the following day, when it was thought a date for a hearing probably would be set. The tension eased somewhat April 7, when Mr. Lewis indicated a willingness to yield on some demands.

Optimism waned, however, on April 8 in the operators' camp after three subcommittees spent long sessions trying to work out technical problems. Nevertheless Chairman Van Horn asked Dr. George W. Taylor, WLB chairman, that a scheduled meeting of that body be postponed in view of "progress" made by the conferees. The following day, a tentative understanding was reached.

The agreement was reached April 10 a few hours after Secretary of the Interior Ickes took possession in behalf of the government of 235 mines in seven States where work stoppages had halted output. The seizure, which took place on executive order by President Roosevelt, occurred five days after WLB had warned that such action would be taken unless strikes were terminated promptly. Taken over were 70 mines in Pennsylvania, 4 in Ohio, 49 in Tennessee, 43 in Kentucky, 6 in Virginia, 18 in Indiana and 45 in Alabama.

Production fell to 60 percent of normal or less April 3, when more than 60,000 miners failed to report for work. Absenteeism was especially marked at captive mines, threatening to make scripps inroads into steel output; output of metallurgical coal fell to 25 percent of normal. Tonnage gained gradually as absentees drifted back to work, but on April 17 Mr. Ickes notified those still away from work to return to their jobs of producing coal vitally needed to make war equipment.



The situation in Alabama continued critical until well along toward the end of April.

Progressive Mine Workers and the Coal Producers Association of Illinois also have agreed on a two-year contract providing \$1.50 a day travel time and increasing vacation pay from \$50 to \$75. It also calls for an increase of \$1.07 to a total seven-hour daily rate of \$7.07 for outside men and \$1 to a \$9 rate for inside electricians, exclusive of travel time. Second- and third-shift workers are to receive 4 and 6c. an hour more, respectively, than first-shift men. Retroactive to April 1, the contract replaces that which expired March 31, which had been adjusted to provide \$92.50 compensation for two years in lieu of travel time, including strip and other outside men. Previously, Progressives had received no travel time pay.

### Text of New Bituminous Contract

This agreement, made this 11th day of April, 1945, between the coal operators and associations signatory hereto, represented in the National Bituminous Coal Wage Conference, parties of the first part, and the United Mine Workers of America, parties of the second part, covering all of the bituminous coal mines of the United States represented in said conference, amends and supplements all agreements as herein provided. This agreement carries forward and preserves the terms and conditions contained in all joint wage agreements effective April 1, 1941, to March 31, 1943, the supplemental agreement providing for the six-day workweek, and all of the various district agreements executed between the United Mine Workers of America and the various coal associations and coal companies (based upon the aforesaid basic agreement) as they existed on March 31, 1943, and as amended and supplemented by the agreement herein set out, witnesseth:

1. (a) For all inside employees a work day of 9 hours from portal to portal is established, including a staggered 15 minutes for lunch, and without any intermission or suspension of operations throughout the day. Of these 9 hours, 7 hours shall be paid for at straight rate, the eighth hour shall be paid for at time and one-half, and the ninth hour shall be paid for at a flat rate of \$1.50 (\$1 at time and a half) for each inside day worker. Tonnage, yardage, deadwork or footage workers shall be paid full earnings predicated upon the basic tonnage, yardage, deadwork and footage rates that existed on March 31, 1943. As payment for travel and overtime beyond 7 hours per day, there shall be added to the tonnage worker's earnings one-ninth



of his daily earnings. On his sixth consecutive day of work in any week there shall be added to the tonnage worker's earnings for that day one-ninth of such earnings.

(b) For all outside employees (including all strip-mine and coke-oven employees) a work day of 8 hours and 15 minutes is established, including a staggered 15 minutes for lunch, and without any intermission or suspension of operations throughout the day. For these 8 hours and 15 minutes each outside employee shall be paid the same amount per day as he is now receiving and which is based upon seven hours of straight time and 1 hour and 15 minutes at time and one-half. In addition thereto each outside employee shall receive \$1.07 per day to equalize earnings of the outside employee with earnings of the inside employee.

(c) For outside employees whose normal work day heretofore has been eight hours, a work day of 8 hours and 35 minutes is established, including a staggered 15 minutes for lunch, for which they shall receive the same pay they are now receiving plus a flat \$1.07 per day to equalize earnings of the outside employees with earnings of the inside employees.

(d) The application of rates covered by subdivisions (a), (b) and (c) of this paragraph for time worked less than 7 hours or in excess of 9 hours are shown in the Appendix attached hereto and made a part hereof.

**EXCEPTION:** When breakdown of equipment, accidents, shortage of transportation from the mine, or other causes beyond the control of the management prevent; provided, however, that lack of market demand is not to permit the management to operate on less than a 9-hour shift for inside employees and on less than an 84-hour shift for outside employees.

**EXCEPTION:** Overtime shall not be pyramided and time and one-half shall not be paid where the regular rotation of shifts requires the working of more than one shift in any consecutive 24-hour period.

2. For all inside employees, work time shall begin at the portal and end at portal; but in shaft mines, for the purpose of making the operations of lowering and hoisting men orderly and safe, the man-trips shall leave the bottom ten minutes after the start of each 9-hour shift and shall arrive at the shaft bottom five minutes before the end of each 9-hour shift. Employees shall be at the shaft collar in time for all of them, to be lowered so as to be in the man-trip at the scheduled departure time. The operator shall have the right to designate the portal or portals and may move or establish new portals if adequate facilities, conveniences and safety are furnished the mine workers at such new portals, subject to the right of review on the part of the mine workers under existing grievance machinery.

3. Time and one-half or rate and one-half shall not be paid for Saturday work if the individual mine worker has not worked on Monday, Tuesday, Wednesday, Thursday or Friday of the week.

4. (a) Employees scheduled for and starting work on the second shift, whether

paid by the day or by the ton, shall be paid 4c. additional for each hour employed. (Example: For nine hours, portal to portal, the increased pay hereunder shall be 36c.)

(b) Employees scheduled for and starting work on the third shift, whether paid by the day or by the ton, shall be paid 6c. additional for each hour employed. (Example: For nine hours, portal to portal, the increased pay hereunder shall be 54c.)

(c) The hoisting of coal shall be permitted on each shift.

5. Classification of mobile loading machine rates in all agreements shall be changed to provide the following: Drillers and shooters, not less than a day rate of \$8 and an hourly rate of \$1.143, except that where the basic inside day rate is less than \$7, the rate for drillers and shooters on mobile loading machine units shall be increased 14.3 percent. Loading-machine operators' helpers shall be paid not less than the drillers and shooters' rate in any district.

6. The general day-labor classifications inside shall be amended to provide as follows:

The rate for inside electricians or mechanics repairing loading and cutting machines, haulage locomotives and conveyors, shall be not less than \$9 per day, or \$1.286 per hour, except that where the basic rate for electricians or mechanics in any district is less than \$7.80, the base rate shall be increased 15.4 percent.

The rate for inside, electrician or mechanic apprentices or helpers, including wiremen, bonders, oilers, telephone men and storage-battery chargers, shall be not less than the basic inside day rate in any district.

The work performed by an electrician or mechanic apprentice or helper included in the inside day wage scale shall in no case carry the rate applicable to regular

electricians or mechanics except in the case where there is a vacancy in such positions and the work actually performed is that of the regular electrician or mechanic.

7. Slate pickers shall receive the basic outside rate per day and per hour.

8. For each mine where the practice now prevails, the delivery of cars to the working places in the mines by pushing will be the subject of local negotiations and will not be prohibited where it is impracticable to deliver them to the working place otherwise than by pushing. Any controversy as to the continuation of the practice where it now prevails must be considered as a dispute, and shall be settled promptly in accordance with the customary grievance machinery.

9. All employees at mines which produce coal six days per week shall be given a fair and equal opportunity to work on each of such six days. Laying off individual mine workers during the week for the purpose of denying them six days' work is prohibited.

Work performed on the seventh consecutive day is optional, but when performed shall be paid for at double rates.

10. The management shall furnish all necessary mine workers' tools.

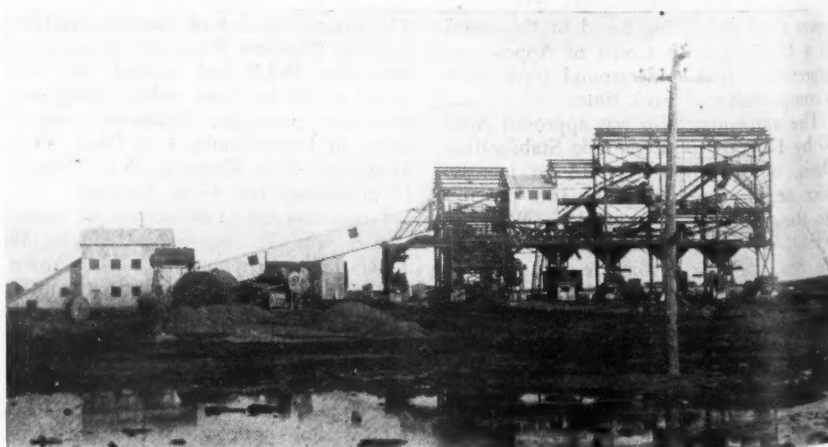
Safety equipment and devices, including electric cap lamps, and also carbide lamps, shall be furnished by the management without charge. This shall not include, however, personal wearing apparel such as hats, clothing, shoes and goggles. In lieu of furnishing carbide lamps and carbide, the operator may, at his option, pay to the mine workers who use carbide lamps at their work 6c. per day, and the mine workers shall continue to furnish their own carbide lamps and carbide.

No charge shall be made for blacksmithing.

## Truax-Traer Opens No. Dakota Stripping

One of the largest strip mines in North Dakota, the Dakota Star mine, has been opened near Hazen, Mercer County, by the Truax-Traer Coal Co. A railroad spur has been run from Hazen to the mine, five

miles away. Equipment includes a 12-yd. electric shovel, 20-ton trucks and an all-steel tippie. In its first year of operation it is expected to produce 250,000 tons of coal, thereafter producing at the rate of 500,000 tons annually. Some workers live in modern concrete-block barracks near the mine, and others in concrete-block houses built by the company in a new town.



New all-steel tippie being erected at Truax-Traer's Dakota Star mine, near Hazen, N. D.



# HAULS 60 TONS *with ease!*

A real strip mine hauler must be able to operate under the widely varying conditions it encounters on each run. It requires great traction to move heavy loads through loose coal and broken ground in the pit; traction and power to climb the ramp; fast running on the road; and high maneuverability for easy handling in confined areas at shovel and plant.

Walter Tractor Trucks meet all these specifications in the fullest. Tremendous traction is derived from the exclusive Four Point Positive Drive, incorporating three automatic locking differentials, which send power to each of the four driving wheels according to available traction at any instant. This eliminates wheel spinning, preventing road gouging, tire grinding and bogging down on soft or slippery surfaces.

As a result, full power of the 300 h.p. butane engine is utilized, furnishing ample reserve for every need. Wide gear ratio of the tractor type transmission meets every contingency. Easy maneuverability and handling are obtained from the short wheelbase, scientifically distributed weight, hydraulic steering and powerful air brakes.

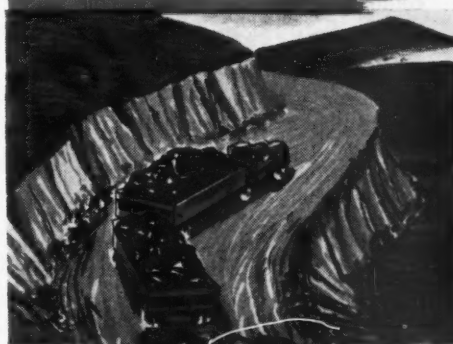
Learn how other strip mines have met huge tonnage gains and lowered costs with Walter Tractor Trucks.

WRITE FOR ILLUSTRATED  
FOLDER TODAY!

IN THE PIT



ON THE RAMP



ON THE ROAD



AT THE PLANT



## WALTER TRACTOR TRUCKS

WALTER MOTOR TRUCK CO.  
1801-19 Irving Ave., Ridgewood 27, Queens,  
L. I., N. Y.

11. Any grievances or disputes as to the starting time shall be handled in accordance with the established practices for the adjustment of such grievances.

12. The provisions relating to vacations with pay are hereby amended to substitute, at the appropriate places therein, seventy-five (\$75) dollars for fifty (\$50) dollars.

In the interest of the national war effort, it is agreed that the vacation period shall be eliminated for the year 1945 without prejudice or modification in the existing vacation clause of the agreement. This agreement shall in no wise affect the payment of seventy-five (\$75) dollars to be paid by all operators to each individual in conformity with the terms of the agreement.

The above payment to individual mine workers entitled to vacation shall be made at the option of the employing operator, except that in all cases full payment of the amount prescribed shall be made not later than the last pay day occurring in the month of June, 1945.

The vacation payment of the 1946 period shall be made on the last pay day occurring in the month of June of that year.

13. If the United Mine Workers make a wage agreement during the period of this agreement, covering wages or working conditions with any person, corporation, association or district, more favorable to the operators than as contained herein, then this agreement shall be modified so that the operators who are parties hereto shall receive all of the benefits of such more favorable agreement.

For the duration of this agreement no strikes shall be called or maintained hereunder.

14. The operators agree that they will not lease any operating mines subject to this agreement as a subterfuge for the purpose of avoiding the provisions of this agreement.

15. This agreement, dated this 11th day of April, 1945, shall be effective as of April 1, 1945, and shall continue in effect hereafter subject to the conditions and termination as herein provided. At any time prior to April 1, 1946, in the event a significant change occurs in the government wage policy, either party shall have the right to request negotiations on general wage rates.

At any time after March 1, 1946, either party may give ten days' notice in writing of a desire for a negotiating conference upon the matters outlined in said notice. The other party agrees to attend said conference. At the end of fifteen days after the beginning of such negotiating conference either party may give to the other a notice in writing of the termination of this agreement, to be effective five days after the receipt of such notice.

Service of the above notice for a negotiating conference or termination of this agreement by the operators shall be only upon the request of a majority of the tonnage represented in this conference as disclosed by the records of the present joint conference. For the purpose of maintaining an organization, the Operators' Negotiating Committee as set up in this joint conference shall continue in

existence during the life of the agreement. Service upon the Operators' Negotiating Committee or by it shall constitute proper notice.

At any time after March 1, 1947, one or more of the five operator groups, as designated by the records of the present conference, may serve notice in writing for a negotiating conference and thereafter for termination of this agreement.

16. This agreement is an integrated instrument and its respective provisions are interdependent and shall be effective from and after April 1, 1945, subject to the approval hereof by the appropriate governmental agencies and the granting by the Office of Price Administration of advances in maximum prices to cover the increased costs occasioned hereby.

17. It is agreed that any conference or conferences held under the terms of paragraph 15 shall be convened at Washington, D. C., unless such place of meeting is changed by mutual agreement of the parties.

18. Signed this 11th day of April, 1945, at Washington, D. C.

#### APPENDIX

1. Referring to 1 (a), the inside day worker shall be paid his straight productive rate from portal to portal for seven hours or less time per day. If his time from portal to portal is less than nine hours but more than seven, he shall be paid his straight productive rate for the first seven hours and time and one-half at his productive rate for the hours over seven. When his time from portal to portal is nine hours, he shall receive seven hours at his straight productive rate, one hour at time and one-half, and the ninth hour at a flat \$1.50.

## Winning Companies Honor Employees At Award Presentation Ceremonies

A NUMBER of companies winning "Coal-for-Victory" awards have held special presentation ceremonies during the past month to honor supervisors and employees who helped make their 1944 production and efficiency records possible.

The Victoria Coal Co., Monessen, Pa., which won both the "War Production Efficiency" and "Victory Coal Production"

2. Referring to 1 (b), to arrive at the straight time rate per hour for outside men whose hours of work are eight hours and fifteen minutes, it shall be computed as follows: Add to his present wages for eight hours and fifteen minutes \$1.07; divide this sum by 8.875. For the sixth consecutive day this divisor shall be 12.375.

3. Referring to 1 (c), to arrive at the straight time rate per hour for outside men whose hours of work are eight hours and thirty-five minutes, it shall be computed as follows: Add to his present wages for eight hours and thirty-five minutes \$1.07; divide this sum by 8.875. For the sixth consecutive day this divisor shall be 12.87.

## Hold Foremen's Union Is Part of U.M.W.

The United Clerical, Technical and Supervisory Employees is a branch of the United Mine Workers of America, according to the unanimous report made April 6 by a War Labor Board panel that conducted hearings on a dispute involving foremen of the Ford Collieries Co. and four other western Pennsylvania producers. A majority of the three-man panel held that despite organizing activity seeking to represent the foremen, "technically speaking, there has been no breach of the Appalachian agreement."

The panel members included William Spohn, Madison, Wis., chairman; Charles Gregory, professor of law, University of Chicago, and Harry Dworkin, Cleveland attorney.

Mr. Gregory, who delivered the majority opinion, and Mr. Spohn agreed that U.C.T.S.E. could not violate a contract to which it was not a party and concluded that the panel should not be precluded from considering the supervisors' demands on their merits.

The panel recommended (1) that supervisors should be paid a higher rate than highest paid rank-and-file employees; (2) that each supervisor should have choice of receiving hourly or salaried wage, subject to change within six months; (3) that no uniform work day should be established; (4) that seniority should govern in promotions, etc., subject to grievance procedure; (5) that a three-step grievance procedure be worked out by negotiation and permitting management to suspend in interests of safety.

awards, held exercises at the mine on Sunday, April 8, in which officials of the company, employees, and representatives of the union took part. In describing the event, A. L. Brautegam, owner, said:

"Each miner was given a special painted blue safety miner's hat with the inscription 'distinguished service' on one side and the American flag on the other side. Each

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COAL AGE

Even If It Didn't  
offer Many More Advantages

— these 4 make the CLARKSON  
**UNIVERSAL 24BB**  
the Outstanding **LOADER**  
in the Coal Mining Industry

- 1** —Only ONE motor is required to power the CLARKSON—the lowest loading machine on wheels.
- 2** —When undermining standing coal it proves its outstanding superiority on 'tight corner shots'.
- 3** —Its balanced Swinging Device PREVENTS hitching breaks.
- 4** —No other loader 'cleans up' the coal or rock at the face as does a CLARKSON, thereby eliminating hand-shoveling.

**Better Investigate before You Buy ANY Loader**

*The*  
**CLARKSON**  
MANUFACTURING CO.  
NASHVILLE—ILLINOIS





and every one expressed his appreciation for the award and the hats and there was almost a full response at the ceremony. After the ceremony we had refreshments and entertainment for all the employees."

A dinner for the supervisory staff and presentation ceremonies for employees were held by Peerless Darby Coal Co., Splint, Ky. At the dinner, held at the Lewallen Hotel, Harlan, Ky., George H. Ward, secretary, Harlan County Coal Operators Association, presented the awards.

"All of the men seemed to evidence a great deal of interest and satisfaction upon receiving these awards," said Roland C. Luther, president. "Therefore, I feel that this idea was definitely worth while. . . . I hope that you will be able to continue a similar type of award for 1945."

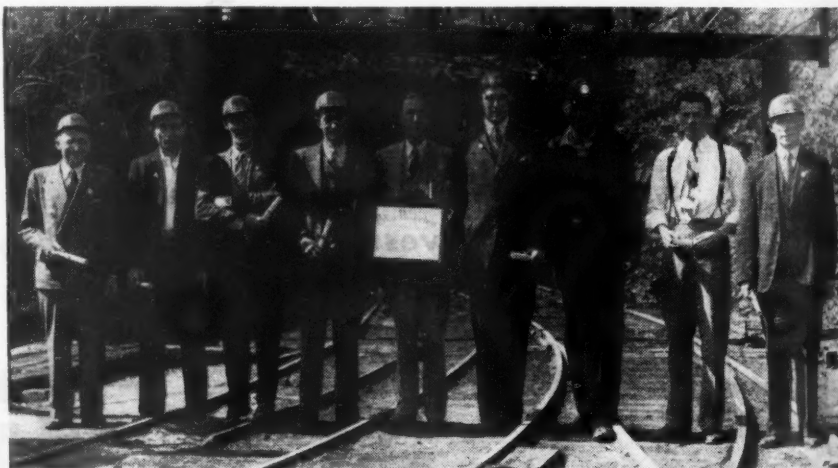
Full-page newspaper advertisements in local papers announced the winning of the awards by mines of the West Kentucky Coal Co., Earlington, Ky.

The advertisement paid special tribute to the men who had helped achieve the company's production record. "Congratulations to the men who by their patriotic devotion to duty and their realization of the necessity for peak coal production during wartime made this record possible," it said.



Executives and officials of the Weyanoke Coal & Coke Co., Arista, W. Va., held a dinner at the West Virginia Hotel, Bluefield, to celebrate the winning of both Coal-for-Victory awards (Coal Age, April, 1945). Presentations of the company certificate to G. F. Mash, vice president and general manager, and of individual certificates to the production men were made by J. H. Edwards, associate editor of Coal Age. Left to right, seated: Mr. Edwards, W. E. E. Koepler, secretary, Pocahontas Operators' Association; Harry E. Cohn, vice president S. J. Patterson Co. and a director of the coal company; Mr. Mash; Luther Williams, electrical engineer; R. L. Nichols, secretary-treasurer; Dr. B. S. Clements, company physician, and Ray Pearman, store manager, Arista store. Standing: Charles Anderson, store manager, Hiawatha store; T. W. Bland, general maintenance, Hiawatha; C. I. Nichols, general mine foreman; Howard Bell, section foreman; Raymond Fizer, supervisor house maintenance; C. T. Sisk, section foreman; Claude Karnes, office clerk; Earl Pardew, section foreman; G. H. Cox, purchasing agent; J. B. Stratton, section foreman; Roy J. Rogers, office manager; Gus Robertson, assistant mine foreman; Dee Bailey, preparation manager; Arthur Mash, supply clerk; Terry Simmons, section foreman, and A. B. Mays, mine engineer.

Scenes at presentation ceremonies of "Coal for Victory" awards at Victoria Coal Co., Monessen, Pa. Top: Key men and officials of the union at the mine display one of the awards. From left to right: Ernest Peroni, United Mine Workers; Ernest Shimmel, chief electrician; J. H. Gilmer, assistant mine foreman; Charles Howarth, assistant mine foreman; A. L. Brautegam, owner; Marino Marini, outside foreman; Hugh McGee, assistant to mine foreman; Joe Walkush, treasurer, U.M.W.; Joe Hoffman, mine foreman. Bottom: The employees line up at the presentation ceremony wearing the new blue safety hats given in recognition of their work by the company.



FAST-MOVING **TOURNAPULLS** GIVE

## **SCRAPER STRIPPING ECONOMIES OVER TRUCK-LENGTH HAULS**

ON GEORGIA MINING OPERATION

Attapulugus Clay Co. takes advantage of fast, 14.9 m.p.h. Tournapull speeds with good haul roads.



### **Using Four Super C TOURNAPULLS on 1-Mile Round-Trip Stripping Job**

85 feet of sandy clay overburden, covering an 8-foot vein near, Amsterdam, Ga., necessitated a low-cost stripping method for profitable operation. Further, hauls were long—up to 1 mile, round trip.

Attapulugus Clay Company put four fast-moving Super C Tournapulls on the job. These big rubber-tired, 150 h.p. Scraper units excavate their own loads, haul and spread in continuous fast-traveling cycles . . . thus, eliminated costly, one-purpose loading and hauling tools for stripping.

### **Smart Operators Use Snatch Loading, Fast Haul Roads**

One snatch tractor helps all four units get 15-yard, heaped capacity loads fast. Speeds up to 14.9 m.p.h. enable them to cover the one-mile cycles at truck speeds. To take full advantage of Tournapull fast travel ability, Hall Construction Co., operating the Tour-

napulls for Attapulugus, maintain good haul roads with a motor grader.

### **Save Rehandling Overburden**

Like this modern mining company, you'll find, too, that (1) the faster speeds of Tournapulls—2 to 3 times greater than the fastest crawling tractors—plus, (2) low-cost Carryall Scraper loading, hauling, spreading economies, make practical longer hauls at scraper costs . . . will help you move overburden back from the pit where expensive rehandling is unnecessary.

### **Wide Range of Mining Uses**

Let your local LeTourneau distributor tell you more about Tournapull profit possibilities on your stripping, roadbuilding and materials-handling work. Ask him, too, about money-saving Tournapull interchangeability from Carryall Scraper operation to Tournatrailers for hauling . . . and with Tournacranes for your heavy-lifting jobs. See him TODAY, or write to



Wasting overburden one-half mile from the pit, Tournapulls spread their loads on the move.

One snatch tractor helps all four Tournapulls get 15-yard, heaped capacity loads fast.



**JOB  
PROVED**

OVER 2900 TOURNAPULLS BUILT & SHIPPED

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PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Manufacturers of TOURNAPULLS\*, ANGLEDZERS\*, BULLDOZERS\*, TILTDZERS\*, CARRYALL\* SCRAPERS, POWER CONTROL UNITS, ROOTERS\*, TOURNATRAILERS\*, TOURNACRANES\*, TOURNATRUCKS\*, SHEEP'S FOOT ROLLERS, TOURNAROPES\*, TOURNAWELDS\*, TOURNALIFTS\*.

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## **TOURNAPULLS • RUBBER-TIRED POWER FOR FASTER EARTHMOVING**



## Anthracite Walkout Closes Mines May 1

With the miners and operators failing to reach an agreement, the anthracite industry was closed down May 1. The stoppage followed a vote April 26 of 41,952 to 6,697 in favor of a strike (78,789 eligible to vote), a request for continuation of production for 30 days with all benefits to miners to be made retroactive to May 1 by Secretary Ickes April 27 (agreed to by the operators and rejected by Lewis) and intervention by Secretary Perkins and an order to continue work, with benefits retroactive, by WLB April 30. The WLB order also required operators and miners to appear at a hearing May 1.

Secretary Perkins brought to the conference the same compromise proposal she had earlier presented to the bituminous conference (April Coal Age, p. 133). It was accepted by Lewis, but, with the exception of shift differentials and vacation pay, was unacceptable to the operators. With Lewis still adamant on an extension, the stoppage took place May 1 to the accompaniment of a second order to continue work from WLB. In issuing this order, WLB was understood to have deferred 24 to 48 hours a recommendation that the mines be seized, which Secretary Ickes proclaimed himself as ready to do.

Demands presented to anthracite producers in April included a wage increase of 25 percent and a royalty of 10c. a ton, the proceeds to be devoted by the union to a health and social security program (as in the bituminous demands). These were part of 30 demands presented by John L. Lewis, United Mine Workers president, and a scale committee at the opening session, April 4, of a conference with representatives of 190 producers for a new contract at the Waldorf-Astoria Hotel, New York.

As in the bituminous demands, differential pay of 10c. an hour additional for the second shift and 15c. for the third shift was asked; full payment for travel time; severance pay for suspensions, dismissals or layoffs, and an increase in vacation pay from \$50 to \$100. The full text of the demands appears at the end of this news report.

President Lewis declared that the anthracite miners had received only a 15 percent increase since 1923, and that they deserved a considerable increase because "we know the industry is prosperous."

Solid Fuels Administrator Harold L. Ickes relinquished possession on April 18 of 29 anthracite mines of the Philadelphia & Reading Coal & Iron Co., returning them to their owner after seven months of government operation.

### Miners' Demands

Wage proposals and recommendations adopted by the unanimous vote of the Tri-District Scale Committee, duly authorized and representing all local unions in Districts 1, 7 and 9, United Mine Workers of America:

1. For each ton of coal mined, for use or sale, the producer thereof, by agreement,

shall pay to the United Mine Workers of America in behalf of its anthracite members a participating royalty of ten (10) cents per ton.

Such royalty shall be deemed partial compensation in equity to the mineworker for the establishment and maintenance of his ready-to-serve status, so vital to the profit motive of the employer and so imperatively essential to public welfare.

Funds resultant from accrued royalties will be available to the union to provide for its members modern medical and surgical service, hospitalization, insurance, rehabilitation and economic protection.

2. The maximum hourly provisions of the joint agreement, including the supplemental agreement regarding the 6-day week, be reaffirmed with the following modifications:

(a) That payment of overtime rates for the sixth and/or seventh consecutive day shall apply to the individual worker and not to colliery operation in accordance with Executive Order 9240 as interpreted by the U. S. Department of Labor; with the further stipulation that employees losing time through no fault of their own, or who are deprived of work through no fault of their own, shall be entitled to receive overtime rates for the sixth and/or seventh day in the work-week.

(b) Time and one-half or rate and one-half shall be paid after seven (7) hours in any one day or after thirty-five (35) hours in any one week.

(c) The present 6-day work week shall be eliminated when the war emergency ends, with the understanding that the total amount of wages and earnings received and provided by the various agreements shall be maintained.

3. (a) All contract rates and the hourly, daily and monthly rates of all outside and inside company men shall be increased twenty-five (25) percent.

(b) Where tonnage rates are paid,

same shall be on the basis of the legal ton of 2,000 lb.

(c) Premium payments shall be made to all employees on the basis of ten (10) cents per hour for the second shift and fifteen (15) cents per hour for the third shift; contract workers to be compensated on a start basis.

(d) The minimum shift rate for any classification shall not be less than the present outside minimum rate plus the increase thereon proposed in Section 3 (a) hereof.

(e) Pay for six holidays.

4. Proper readjustments and allowances be made on conditions referred to in resolutions submitted by local unions and enumerated partly as follows: Pay for all sheet iron, props, rock, slate and other impurities; pay for carrying timber and all materials and supplies; pushing coal, buggies or cars; forepoling; with extra payments for work beyond a certain distance.

5. Establishment of a uniform rock-work scale.

6. A uniform standard rate shall be established for mechanics and mechanics' helpers.

7. Many resolutions indicate that men engaged in continuous-shift operations are dissatisfied with present arrangements in many sections of the region. Special consideration shall be given to this matter so that a more satisfactory arrangement can be applied.

8. Payment of severance pay for suspensions, dismissals or layoffs.

9. The vacation pay shall be increased to \$100.

10. A proper uniform minimum rate shall be established for consideration miners and consideration miners' laborers on an industry-wide basis.

11. Proper uniform rates shall be established for men engaged in mechanical and machine mining.

12. Travel time shall be paid for at



"I hear he talked himself into a job!"

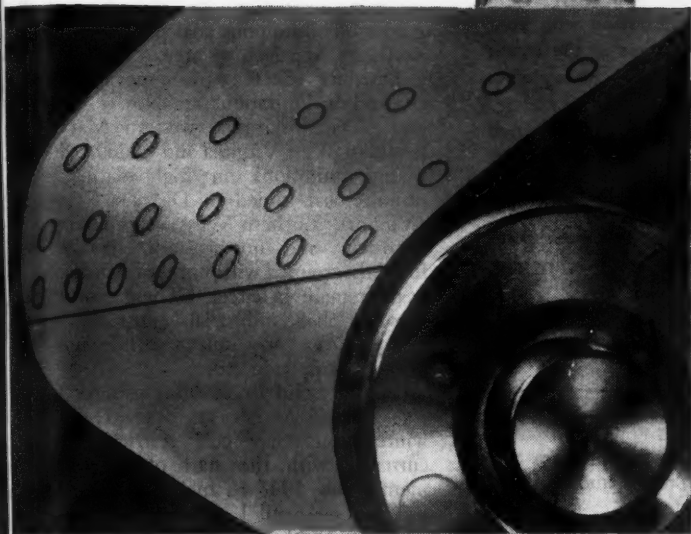


# Extensible-Tip in CONDOR ENDLESS BELTS

an important MANHATTAN development  
that steps up belt life and performance

## ADVANTAGES

1. Increases flexibility at splice.
2. Can be operated over smaller pulleys.
3. Can be operated at higher speeds and heavier loads.
4. Prolongs splice life 3 to 10 times.
5. Reduces belt and maintenance costs.



All warp threads in outer plies are cut by suitably spaced perforations filled with "live" FLEXLASTICS, which are then vulcanized to become "elastic rivets." These stretch and relax progressively (see illustration) as they pass over the arc of contact, providing stress relief for every warp thread, permitting use of smaller pulleys on short-center drives and higher speeds.



Above: Ordinary type of splice which failed when ply end gave way.  
Below: A splice with EXTENSIBLE-TIP, still unbroken after running 10 times as long under identical conditions. This increased life is due to **extended-area stress relief**.



The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS. Condor Belts are now made in the dark, war-time color.



## THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES AND FACTORIES

PASSAIC, NEW JERSEY



A belt made endless in the conventional manner has all flexing strain **concentrated in a line** at the ends of top and bottom plies. This concentration of strain soon ruptures the bond between the ends of the outer plies and the rest of the belt and unnecessarily shortens service life.

MANHATTAN'S EXTENSIBLE-TIP—an exclusive, patented Strength Member development—provides multiple stress relief, uniformly **distributed over an area** of the belt where the duck ends. In addition, the end is welded to the adjacent ply by "elastic rivets" made from special FLEXLASTICS.

It is this extended area of stress relief that makes the Extensible-Tip last as long as the belt, lets you run the belt at higher speeds, over smaller pulleys, on short-center drives, and increases its service life from three to ten times over ordinary methods of making the same belt endless.

You protect the continuity of your production when you use MANHATTAN Endless Belts, all of which are made with the **extended-area stress relief** provided by the MANHATTAN EXTENSIBLE-TIP.

regular rates with pay for the full lunch period.

13. Hats, caps, goggles, special shoes, rubber boots and oil clothes shall be furnished by the employer without charge to the employee.

14. All explosives, cables, detonators, steel measuring tapes, air, electricity, fuses and other accessories shall be furnished by the employer without charge to the mine workers.

15. All employers shall be required to furnish union-made tools, explosives and other supplies.

16. Abolish court-house dockage systems and all other penalizing dockage arrangements.

17. Abolition of physical examinations in the hiring and rehiring of employees.

18. When men report for work on their respective shifts and are unable to start work due to failure of the company to supply timber, cars, supplies or for other reasons, such employees shall be compensated for one shift at their respective rates for such days when they are denied work for the above reasons.

19. A uniform price for coal sold to employees at less than the going circular price.

20. Mine committees or other officers of the organization shall have the right to original jurisdiction in grievances and shall have the right to raise grievances whenever necessary.

21. All day work and contract rates shall be brought up to date, and all supplemental agreements shall be recorded therein. Where supplemental agreements have been made which lower former standards, through which the work is more burdensome and earnings less, such agreements shall be abolished and former standards and practices restored.

22. Agreement to aid returning war veterans in securing employment as provided by law, protecting their seniority rights, and dealing with problems relating to re-employment.

23. Proper qualified seniority shall be applied as affecting the men in the industry so that discrimination in layoffs or promotion shall be abolished. Suspension on account of age shall be prohibited.

24. Abolition of the system of replacing employees with monthly men, or bosses, during idle time at the colliery.

25. The present agreement provides in principle for the abolition of the individual and special contract system. In some sections of the region there seems to be a dispute as to the application of this principle. In order to clear the matter up definitely, we reiterate the demand that the Joint Conference should arrange for implementation of this principle so that the purpose and intent of the contract shall be carried out, and such individual and special contract system be abolished without question. The granting of leases for the same purpose should be similarly treated.

26. All employees of the industry, except the superintendent and one mine foreman at each mine, shall come within the terms and provisions of the general agreement.

27. All repair or plant construction work

## YOU CAN HELP

Paper is a Number 1 war material shortage—because over 700,000 different war items are wrapped, packaged, labeled, tagged or made from paper or container board. The Pacific war, when it speeds up, will require stupendous quantities of paper and board, since double and triple packing are required for protection against weather, insects, etc. So please—

1. Share this magazine with your associates. Because of the paper shortage, the number of copies is limited.

2. Organize for a continuous drive in your office and plant to collect waste paper of any kind to put into paper salvage. Clean out old files, dead correspondence, obsolete records, useless display materials, cartons, etc.

Aid the war effort—speed victory—  
DO THIS EXTRA BIT TO HELP.

throughout the region connected with the mining, preparation or compression of coal shall be under the terms and jurisdiction of the general agreement.

28. All employers shall be required to comply with the laws of the Commonwealth of Pennsylvania respecting workmen's and occupational disease compensation.

29. All resolutions submitted to the scale committee by the local unions in Districts 1, 7 and 9 and not specifically covered in these proposals shall be referred by the scale committee to the Joint Conference for consideration during the negotiations and every effort be put forth for the elimination of abuses and the correction and improvement of conditions as contemplated in such resolutions.

30. The new agreement to be negotiated shall be effective From May 1, 1945, and continued until either party may terminate the agreement by giving twenty (20) days' notice in writing in advance of such cancellation.

## Old Ben No. 9 Mine Prepares to Resume

No. 9 mine of the Old Ben Coal Corp., Benton, Ill., which has been idle for more than 20 years, is being prepared for a resumption of operations as one of the nation's most modern producers, according to Roy Adams, general superintendent. Construction of a new concrete shaft and skip hoist 100 ft. south of the old shaft has been completed as well as other improvements. The Missouri Pacific R. R. is constructing a new line  $4\frac{1}{2}$  miles long from the mine to a junction in Johnson City, which will be completed in two more months.

## Restrictions Lifted To Facilitate Output

Industrial consumers and railroads were warned April 21 by the Solid Fuels Administration for War that unless they stop excessive consumption of scarce high-grade northern Appalachian coal and shift to other available grades it may be necessary to restrict their shipments in accordance with their essentiality. To avoid having to invoke such action and to encourage purchases of lower grades, SFA issued amendment No. 2 to Regulation No. 27, removing restrictions on stockpiling of all grades of bituminous coal produced in the northern Appalachian area.

Districts affected by removal of the stockpiling limitations are Nos. 1, 2, 3, 4 and 6 (Pennsylvania, western Maryland, northern West Virginia and Ohio). Stockpiling limitations on high-volatile bituminous coal mined in Districts 7 and 8 (Virginia, southern West Virginia, eastern Kentucky and northeastern Tennessee), formerly grouped with northern Appalachian coals, remain in effect. These limitations provide that industrial consumers and railroads can carry only a certain number of days' supply in stock.

Deputy Solid Fuels Administrator C. J. Potter acted March 31 to revoke various winter emergency coal restrictions concurrently with the start of the government's new 1945-46 fuel-year distribution program on April 1.

## Preparation Facilities

BLACKWOOD COAL CO., Minersville, Pa.—Contract closed with Wilmot Engineering Co. for one 5-ft.-diameter Hydrotator; feed capacity, 40 t.p.h. of rice coal; one 7-ft.-diameter Hydrotator; feed capacity, 60 t.p.h. of barley coal; one 7-ft.-diameter Hydrotator; capacity, 50 t.p.h. of No. 4 coal; and one 16-ft.-diameter Wilmot classifier to prepare No. 5 coal; capacity, 40 t.p.h.

D. & F. COAL CO., Minersville, Pa.—Contract closed with Wilmot Engineering Co. for one Type E Simplex roughing jig to prepare egg coal; feed capacity, 75 t.p.h.

MOOSIC MOUNTAIN COAL CO., Jessup, Pa.—Contract closed with Chance Coal Cleaner for one 12-ft.-diameter Chance cone to treat egg to buckwheat inclusive; feed capacity, 200 t.p.h.; coal company to do installation work; to be completed about midsummer.

BLACKWOOD COAL CO., Minersville, Pa.—Contract closed with Chance Coal Cleaner for one 15-ft.-diameter cone to treat buckwheat to egg inclusive; feed capacity, 33 t.p.h.; to be installed by Staples-Sweeney Mfg. Co.; to be completed about Sept. 1.

ADELPHI COAL MINING CO., Avoca, Pa.—Contract closed with Deister Concentrator Co. for three SuperDuty Diagonal Deck No. 7 washing tables to clean No. 1 buckwheat and three to treat rice coal.

VALLEY VIEW COAL CO., Pittston, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal Deck No. 7 washing table to treat barley.



# 4 STAR Time-Saver

## FOR COAL LOADING



### HIGHLY PORTABLE

The Mannix Construction Co. at Grassy Lake, Alberta, Canada is using a big-capacity Model 8 Athey MobiLoader, as shown above, to load coal on their mining operations. This was done without the need for shooting.

### BIG CAPACITY

The MobiLoader's proven design and low cost operation has made it a useful loading tool on coal mining applications. The MobiLoader's outstanding features of portability, high production, diesel operating economy and lower initial investment, are attracting the attention of the coal industry. Using the overhead loading principle, the Athey MobiLoader loads at the front, carries the material in reverse, and discharges overhead into truck or railway car.

### DIESEL POWERED

### LOWER FIRST COST

Your nearest Athey-"Caterpillar" Dealer will be glad to give you full details on Athey MobiLoaders, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

*Model W4-1 Athey MobiLoader loading reclaimed coal at Millersville Collieries, Ashland, Pennsylvania.*



# Athey

## MOBILOADERS



## New Strip Law In West Virginia

Preliminaries for enforcing new laws governing strip mining in West Virginia have been completed and new forms for applications, with rules and regulations, have been received from the printer by the State Department of Mines, according to Jesse Redyard, chief of the department. The new law, adopted by the 1945 Legislature, requires that strippers restore the land and plant it in vines, trees, grass and shrubs under specifications drawn up by the Mines Department and the West Virginia University Agricultural Experiment Station. Apropos of this, Dean C. R. Orton of the University College of Agriculture has expressed doubt of the legality of the act in imposing an administrative or regulatory function on a research agency.

According to advices from the Attorney General's office, said Mr. Redyard, strippers who had equipment on the ground and actually were mining coal on March 10 will not be subject to the new law unless they move to another tract. Bonds of \$500 an acre or a minimum of \$1,000 are required under the new act, whereas the old law provided for a \$300 bond for the first and \$150 for each additional acre.

## 49 Coal Companies Using JRT Course

Thirty-four bituminous operating companies in Pennsylvania and West Virginia and 15 anthracite companies in Pennsylvania are using the job relations training course of the War Manpower Commission's Training-Within-Industry service, area WMC directors in Pittsburgh and Philadelphia announced this month.

Job relations training is one of three phases of the Training-Within-Industry program. The other two, job methods training and job instructor training, have been used by numerous coal companies, both anthracite and bituminous, to improve manpower efficiency and to help upgrade workers.

The programs are instituted by the War Manpower Commission at companies which agree to give them a trial. WMC instructors give the initial course, and it usually is carried on from that point by company instructors trained under the supervision of WMC.

Job relations training stresses primarily the handling of men by supervisors and strives toward improvement of relations between supervisors and employees.

C. S. Colar, district director, Training-Within-Industry Service, Pittsburgh, lists the following bituminous companies which are using the program:

Barnes & Tucker Coal Co., Barnesboro, Pa.; Berwind-White Coal Mining Co., Windber, Pa.; Crucible Steel Co., fuel division, Crucible, Pa.; Ford Collieries Co., Curtisville, Pa.; Hillman Coal & Coke Co., Pittsburgh; Industrial Collieries Corp., Johnstown, Pa.; Jones & Laughlin Steel Corp., California, Pa.; New York Central R.R., coal division, Indiana, Pa.; Pitts-

burgh Coal Co., Pittsburgh; Rochester & Pittsburgh Coal Co., Indiana, Pa.; Union Collieries Co., North Bessemer, Pa.; Duquesne Light Co., coal division, Pittsburgh; Weirton Coal Co., Isabella, Pa.; Republic Steel Corp., coal division, Uniontown, Pa.; Westmoreland Coal Co., Irwin, Pa.; Arkwright Coal Co., Morgantown, W. Va.; Buckeye Coal & Coke Co., Stephenson, W. Va.; Christian Colliery Co., Mahan, W. Va.; Imperial Colliery Co., Burnwell, W. Va.; Kelley's Creek Colliery Co., Ward, W. Va.; Kingston-Pocahontas Coal Co., Hemphill, W. Va.; Koppers Coal Division mines at Beards Fork, Helen, Glen White, Long Branch, Powellton, Stanaford, and Stotesbury, W. Va.; Leckie Fire Creek Coal Co., Fireco, W. Va.; Lillybrook Coal Co. mines at Affinity, Big Stick, and Lillybrook, W. Va.; Mallory Coal Co., Mallory, W. Va.; Marianna Smokeless Coal Co., Marianna, W. Va.; New River Co., Mount Hope and Skelton, W. Va.; Page Mining Co., Page, W. Va.; Peerless Coal & Coke Co., Vivian, W. Va.; Pond Creek Pocahontas Coal Co., Bartley, W. Va.; Purs-

glove Coal Mining Co., Pursglove, W. Va.; Scotia Coal & Coke Co., Brooklyn, W. Va., and Valley Camp Coal Co., Elm Grove, W. Va.

J. M. Convery, district WMC representative at Philadelphia, listed the following anthracite companies:

Edison Anthracite Coal Co., Nesquehoning, Pa.; Lehigh Navigation Coal Co., Lansford, Pa.; The Hudson Coal Co., Moffat Coal Co. and Pennsylvania Coal Co., Scranton, Pa.; Hazle Brook Coal Co., and Jeddo-Highland Coal Co., Jeddo, Pa.; Jermyn Green Coal Co. and Kehoe-Berge Coal Co., Pittston, Pa.; Lehigh Valley Coal Co., Wilkes-Barre, Pa.; Pagnotti Coal Co., Pittston, Pa.; Susquehanna Coal Co., Nanticoke, Pa.; East Bear Ridge Coal Co., Girardville, Pa.; Locust Coal Co., Shenandoah, Pa.; Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.

## Bootleg Mining Continues Decline

Continued decline of illicit activity to 16.7 percent magnitude of March 31, 1941, is shown in the seventh survey of bootleg anthracite holes, released by the Anthracite Committee. The number of active holes dropped from 3,006 to 502 and the number of men employed decreased from 10,762 to 1,806; number of men per hole has remained practically constant at 3.6.

## Panhandle Eastern Gets Certificate

An order has been entered by the Federal Power Commission granting a certificate of public convenience and necessity to the Panhandle Eastern Pipeline Co. to construct and operate facilities to increase the delivery capacity of its main line by 50,000,000 cu.ft. per day. Panhandle Eastern proposes to use the increased capacity principally to supply natural gas to the Ohio Fuel Gas Co. at two existing pipeline interconnections, one near Maumee, Ohio, and the other at the Ohio-Indiana State line east of Muncie, Ind. Panhandle Eastern has contracted to deliver to Ohio Fuel Gas Co. 50,000,000 cu.ft. per day; 25,000,000 cu.ft. per day to be delivered for 20 years and the other 25,000,000 for five years from the date of first delivery.

F.P.C. attached to the certificate certain conditions, one reading: "The facilities herein authorized shall not be used for either the transportation or sale of natural gas, subject to the jurisdiction of this commission, to any new customers of applicant without specific authorization first obtained from this commission."

The decision and order of the Federal Power Commission in issuing a certificate of convenience and necessity to the Memphis Natural Gas Co., authorizing the construction of pipeline facilities to bring additional natural gas into the Memphis (Tenn.) area has been affirmed by the Fifth Circuit Court of Appeals, New

## COAL ACTIVITY

### Bituminous Coal Stocks

	Thousands Net Tons	P.C. Change— From Mar. 1, 1945	From Mar. 1, 1944
Electric power utilities..	12,916	-8.4	-7.2
Byproduct coke ovens..	5,610	-1.5	-11.0
Steel and rolling mills..	666	+0.2	-12.9
Railroads (Class I).....	10,192	-9.9	+6.3
Other industrials*.....	13,263	-7.6	-19.7
Total.....	42,647	-7.5	-9.6

### Bituminous Coal Consumption

	Thousands Net Tons	P.C. Change— From Jan. 1945	From Feb. 1944
Electric power utilities..	6,212	-12.7	-7.2
Byproduct coke ovens..	7,216	-9.0	-4.8
Steel and rolling mills..	943	-12.7	-5.0
Railroads (Class I).....	10,749	-10.5	-6.4
Other industrials*.....	13,128	-10.3	-3.5
Total.....	38,248	-10.6	-5.2

\*Includes beehive coke ovens, manufactured-gas plants and cement plants.

### Bituminous Production

March, 1945, net tons.....	52,360,000
P.C. change from March, 1944....	-4.6
January-March, 1945, net tons....	151,460,000
P.C. change from Jan.-Mar., 1944..	-5.8

### Anthracite Production

March, 1945, net tons.....	5,215,000
P.C. change from March, 1944....	-6.5
January-March, 1945, net tons....	13,855,000
P.C. change from Jan.-Mar., 1944..	-15.8

### Sales, Domestic Stokers vs. Oil Burners

	Stokers	Burners
February, 1945.....	4,914	3,489
P.C. change from Feb., 1944....	+246.8	+9.2
January-February, 1945.....	10,005	7,234
P.C. change from Jan.-Feb., 1944.....	+246.2	+41.3

### Index of Business Activity\*

Week ended April 21.....	235.8
Month earlier.....	233.8
Year earlier.....	239.7

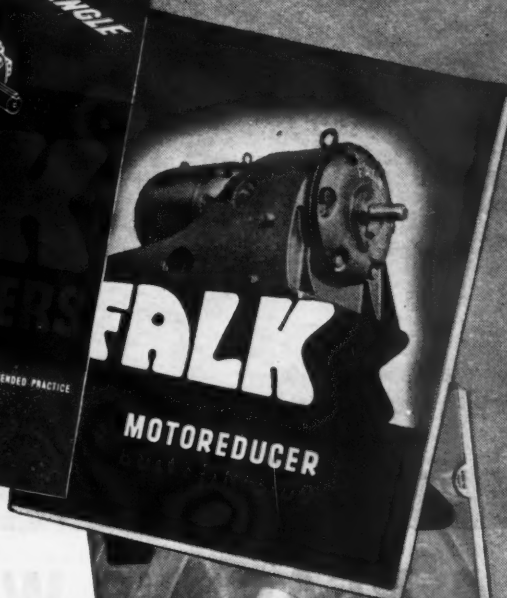
\*Business Week, April 27.

### Electric Power Output†

Week ended April 21.....	4,411,325,000
P.C. change from month earlier..	+0.2
P.C. change from year earlier....	+1.5

†Edison Electric Institute.

The bulletins shown are typical of the engineering service Falk renders to industry.



## The Phrase **FALK** ... A GOOD NAME IN INDUSTRY Possesses Tangible Values For You!

The individual sale of a product is incidental. The service which that product renders is all-important . . . All-important to the buyer, because the continued satisfactory performance of that product confirms his judgment in purchasing it . . . All-important to the seller, because the satisfaction rendered the buyer enables the manufacturer to make sale after sale.

Falk products have been rendering a satisfactory service to industry for over 50 years. It is this satisfactory service that has enabled The Falk Corporation to continue, and to progress. It has enabled the buyer to depend on Falk claims for its products, and to depend on the performance to be secured from those products.

This is what we imply when we say: "Falk . . . a Good Name in Industry." That phrase includes the Falk philosophy of doing business, its policies, its research, its engineering skills, its production facilities, its service to industry, to its community, and to its employees. All this has given the Falk name a tangible value; and this tangible value has been meticulously maintained.

You who buy Falk products have acclaimed Falk a good name in industry. The fact that you were jointly responsible for this good name automatically provides you with values that would not otherwise be available.

Therefore we say "Falk . . . a Good Name in Industry" possesses concrete value, and carries the assurance that "it always pays to consult Falk."

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Marine and Diesel Engine Gear Drives and Clutches • Steel Castings • Contract Welding and Machine Work.

District offices, representatives,  
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## 4 REASONS WHY MINES SPECIFY **SCHRAMM** AIR COMPRESSORS

- ① 100 PER CENT WATERCOOLED      ③ MECHANICAL INTAKE VALVE
- ② COMPACT — LIGHTWEIGHT      ④ FORCED FEED LUBRICATION

**T**here are many compressed air jobs to be done by Coal Mines, and into this versatile picture fits the Schramm Air Compressor. Its features enable compressed air jobs to be done quickly—easily—economically!

Illustrated here is a drilling job, one of many applications for Schramm Compressors. They are designed for heavy duty, continuous service, with minimum attention.

Schramms are built in sizes ranging from 20 to 600 cu. ft. displacement in every type of mounting and assembly. Start your compressor planning by writing for detailed literature and features of Schramm Compressors, both stationary and portable.

**SCHRAMM INC.** **THE COMPRESSOR PEOPLE**  
**WEST CHESTER**  
**PENNSYLVANIA**

Orleans, La. When F.P.C. issued the certificate the order was appealed by the Department of Conservation of Louisiana, and the National Coal Association and the United Mine Workers of America participated in the appeal.

### Group May Study Post-War Prospects

A commission of 15 members "to conduct a full and complete study and investigation of all facts relating to, and ways and means for improving, economic conditions in the bituminous-coal-producing industry of the United States in the post-war period" is proposed in Joint Resolution 133, introduced March 20 in the House of Representatives at Washington by Representative Corbett (R., Pa.).

It is provided that this commission would consist of five Senators and five Representatives, appointed by the Vice President and Speaker of the House, respectively, and of five individuals appointed by the President, all to serve without pay. Two of the latter group would be officers or employees of the Bureau of Mines and the Interstate Commerce Commission. The investigating commission would report to the President and to Congress as soon as practicable the results of its study and investigation, together with its recommendations, with respect to: (a) economic stabilization of the bituminous coal industry in the post-war period and (b) post-war development of possible new and extended uses for bituminous coal and the byproducts thereof.

The resolution was referred to the Rules Committee of the House.

### P. R.R. to Apply Jets To Eliminate Smoke

Following tests in Baltimore, the Pennsylvania R. R. has announced that it will install steam-air jets on all of its locomotives where there is any possibility that they will emit obnoxious smoke. The Mayor of Baltimore, who was present at the tests, was very favorably impressed. Since then the Pennsylvania has installed the devices on several of its switch engines operated in Baltimore, where black smoke has become a problem.

### New Maumee Stripper To Use Dragline

Maumee Collieries Co., Terre Haute, Ind., is preparing to begin operations at its new Linton Mine No. 28, east of Midland, Ind. The new mine will operate in the No. 4 seam, the coal, 3½ ft. thick, being stripped at a depth of 40 to 70 ft.—average 56 ft.—using a Bucyrus-Erie 1150-B electric dragline. This, the first 1150-B to be used in bituminous stripping, carries a boom 185 ft. long and a bucket with a





**SURE, WILLIE CAN SPELL**

**b-u-t-a-d-i-e-n-e**

And chances are he'll tell you it's converted from petroleum into one of the primary ingredients of most synthetic rubber . . . for his juvenile curiosity knows no bounds.

Neither does the scientific curiosity of Hewitt's rubber engineers. That curiosity led to the development, way back in 1931—fourteen years ago—of **SYNTHETIC** rubber compounds for certain needs . . . such as oil and gasoline hose . . . where natural, tree-grown rubber just would not hold up.

**YOU** profit by Hewitt's *fourteen years* of experience with not one, but *many* different types of synthetic rubber. It is your "best bet" that Hewitt products will *do* your job . . . do it **BETTER** . . . do it **LONGER** . . . **COST LESS** per working hour.

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Specify "Hewitt" for quality industrial rubber products. Phone the Hewitt distributor listed in the Classified Section of your telephone directory . . . or write Hewitt Rubber Corporation, 240 Kensington Avenue, Buffalo 5, New York.



**HEWITT RUBBER** *of Buffalo*  
Job-Engineered Industrial Hose • Belts • Molded Goods

QUALITY RUBBER PRODUCTS FOR INDUSTRY FOR 85 YEARS

# BLUE PRINT FOR BETTER DUST SEPARATION



## AIR-CLEANING FINES WITH THE **STURTEVANT** "WHIRLWIND" CENTRIFUGAL

FOR  
GREATER  
TONNAGE

MORE  
THOROUGH  
DUST  
REMOVAL

LOWER  
OPERATING  
COST

For the rapid and economical cleaning of fine coal the answer is . . . air separation of dust from fines, by the Sturtevant Whirlwind Centrifugal. The Sturtevant removes dust from any given fine mesh size of coal and delivers tailings with no air escape, no dust problem. The whole operation is entirely contained.

Sturtevant efficiency lies in the exact counterbalance and control of centrifugal force and air-currents to handle particles with highest efficiency—at lowest cost for **POWER** and **MAINTENANCE**. The Sturtevant is the result of 20 years' experience designing and constructing centrifugal air separators. The cement industry, where air separation is most difficult and exacting, uses hundreds, continually re-orders, has never rejected a single one.

SEND FOR BULLETIN 087

**STURTEVANT MILL CO.**

HARRISON SQ., BOSTON 22, MASS.

### EQUIPMENT APPROVALS

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in March, as follows:

**Goodman Mfg. Co.—Type 91-D-15** chain conveyor; 5 hp., 400 volts, a.c.; Approval 527A; March 15.

**LaDel Conveyor & Mfg. Co.—Model FA chain and flight conveyor;** 10 hp., 500 volts, d.c.; Approval 323A; March 20.

**Jeffrey Mfg. Co.—Type 61 conveyor power unit;** 25 hp., 230 volts, d.c.; Approval 528; March 30.

capacity of 25 cu.yd., being able to place excavated material over 300 ft. away and making a complete cycle in a little more than a minute.

The machine will be assembled at the site of the mine this summer preparatory to starting operations in September. The company's Nos. 25 and 26 mines are to be closed this summer, and No. 25 tippie, having washers for the coarse sizes, is being moved to the new mine, where its capacity will be increased. Link-Belt Co. will add another section to the wash box and provide differential speeds on the washing sections, insuring closer control.

Drilling will be done with 42-T drills, six of which have been purchased to supplant the company's old vertical drills. The coal will be hauled in diesel-motored Walters trucks with 30-ton trailers to the preparation plant, where it will be washed, sized, graded and loaded into railroad cars for shipment over the Milwaukee and Monon railroads to be marketed under the company's trade name, "Linton." The mine is to have a capacity of about 60,000 tons a month.

The Maumee head office is at Toledo, Ohio, and its general and sales offices at 521 Ohio St., Terre Haute. O. S. Roberts is president; Hugh B. Lee, vice president and general manager; David W. Aten, vice president and secretary; B. C. Dudley, vice president in charge of sales; Hugh B. Lee Jr., preparation and sales manager; George W. Rea, general superintendent of mines, and James Harmon, master mechanic.

### Contract Let For Oil-Shale Laboratory

A contract for the construction of the new oil-shale research and development laboratory of the U. S. Bureau of Mines at the University of Wyoming, Laramie, has been awarded to E. C. Nickle, Arcadia, Calif., on a bid of \$534,000. The plans, drawn by Architect Frederic H. Porter, Cheyenne, Wyo., call for a three-story 192x59-ft. fireproof building of reinforced concrete, faced with native stone. The wings will measure 60x44 ft.

Facilities will be provided for laboratory

# SUSTAINED CONSTRUCTION ACTIVITY

## *One Step Toward High Level Employment*

**I**N the 34th editorial of this series, it was pointed out that sustained prosperity, based on high level employment, was a major postwar goal accepted by government, management and labor.

That editorial developed the theme that, if the goal were to be approached without undue sacrifice of our essential liberties, we must forego the search for magic panaceas, and follow the harder but more promising course of analyzing step by step, and industry by industry, the measures that might contribute toward the end sought.

This is the first of a number of editorials following such a particularized approach. It will examine the role of the construction industry in forwarding sustained prosperity.

☆ ☆ ☆

The influence of construction upon the general level of economic activity is important but not decisive. The claim is frequently advanced that major fluctuations of the business cycle might be ironed out by a properly devised and timed public works program; but any examination of the relatively modest contribution of construction activities to total national output will demonstrate its extravagance.

In the twenty years from 1920 through 1939, the value of new construction averaged just over 8½% of the gross national product. If we add repair and maintenance expenditures, the total is increased to a little over 12% of the gross product. But approximately two thirds of the construction of this period was privately initiated, and only one third was represented by government construction, federal, state and local combined. To expect that we can level out the peaks and valleys of our whole economy through manipulating the 4% portion that is represented by government construction is to expect a very small tail to wag a very large dog.

In fact, the record of construction activity in the past has been on the side of disequilibrium rather than stabilization. In boom times construction activity has climbed to relatively higher peaks than those reached by the economy as a whole; in depression periods it has fallen to deeper troughs. Aside from the special work relief program of the depression thirties, the performance of public construction in this respect is little better than that of private. New

government construction mounted with the general trend of the boom from 1921 to 1929, thereby adding its weight to the inflationary trend.

Instead, then, of expecting the construction industry to stabilize our whole economy—a task clearly beyond its power—it would seem appropriate to ask that it look to the more attainable goal of leveling out its own violent fluctuations. If this can be done, many of the most vexing problems of the construction field and of its sphere of influence will be mitigated, employment will be regularized in one important segment of industry where the past record has been particularly uneven, and one aggravating contribution to general business instability will be removed.

The achievement of these highly important, if limited, aims will require the thoughtful, vigorous, and concerted cooperation of management and labor in the construction industry, of a variety of governmental agencies, and of those who direct the sources of construction credit. Of the many measures that must be woven into an ordered program, it is practicable here to present only the broad outline of those which seem to offer the greatest potential usefulness.

☆ ☆ ☆

1. Stabilization implies the holding of a balance rather than a freezing at a given level. No rigid formula for a most desirable level of construction activity is possible or desirable. However, it may be accepted as a reasonable initial premise, that we could sustain in the future without major distortion something like the 12% ratio of total construction to gross national product that has been approximated in the past. If it is to serve as an useful reference point, such a generalized premise must be subjected to constant testing both nationally and locally. There must be careful and continuous scrutiny for signs of demand saturation, cost inflation, and labor shortages, all danger signals of far greater reliability than any percentage formula.

The first requisite then is the general availability of information along such lines, far more complete and current than has hitherto been at hand. The second is a general will to hold building activity at a level as high as but not higher than we probably can sustain. Once this principle is accepted, the problem becomes one of marshalling all available instrumentalities to forward it.

2. Public construction, although too small to exert a decisive influence upon economic activity as a whole, can



condition construction trends to a major degree. If, in the decade following the war, government construction approximates its 1920 to 1940 average of one third of all construction, its properly timed impact could do much to level out the construction cycle.

To do this most effectively, public construction should be deferred where and when private building is going forward at a satisfactory pace, and should be started when and where private activity shows undue slack. All government construction does not lend itself to such adjustment. But a large portion of it could be held up for the three to five years which, upon past experience, would provide the necessary leeway to counteract the more violent fluctuations in private building.

Such a program presents numerous difficulties both political and administrative. None should be insurmountable, and the results promise to be of sufficient moment to justify the extraordinary effort that would be required to coordinate federal, state and local government programs. Here is an excellent forum for testing whether or not government economic activity can be made to supplement rather than supplant private effort to serve ends upon which all are agreed.

3. Since private building, postwar as in the past, must supply the preponderant share of construction activity and employment, costs will continue to play a dominant role in determining levels of operation. Wartime restrictions have created formidable backlogs of deferred demand for most types of private, and for many of public, construction. Such demand is so great that it almost certainly will provide the impetus for a postwar building boom of several years duration. There is considerable doubt that in the beginning our building trades, dislocated by war and at low ebb, can organize rapidly enough to carry their share of the anticipated general advance.

However, if former patterns hold, building activity, after a lagging start, will soar, costs will mount, and eventually will saturate effective demand with resultant collapse. That, of course, is precisely the sort of a situation we are seeking to avoid. Crucial to this end is the prevention of rising costs or, better still, the reduction of building costs from present swollen levels.

A recent study by technicians of the War Production Board on the outlook for private housing construction illustrates the point. From 1900 to 1940 the number of housing units built in this country closely matched the statistics of new family formation. The former ran considerably ahead of the latter from 1920 to 1929, and fell behind by the same margin in the following decade.

If the market for new houses were to be similarly limited for the period from 1940 through 1949, the effective demand for new housing during the last five years (1945-1949) is estimated at 3,000,000 units. That is after allowing for houses built from 1940 through 1944, and for vacancies, demolitions, and other factors. If, however, prices could be reduced to 1939 levels, the 3,000,000 unit demand is estimated as increasing to more than 7,000,000 units. Since the latter figure is substantially beyond our production capacity for the period, a backlog would be

created that would support an effective sustained demand for the subsequent decade (1950-1959) of 1,000,000 units per year, as against half that amount if rents and sales prices mount with increasing incomes.

The precise accuracy of such an estimate may well be questioned. There can be no question as to the general validity of the point illustrated. The progressive lowering of construction costs will stimulate demand in this field as it has in others. Building management, labor, and their suppliers and customers stand to gain from such a result. Unnecessary restrictions against the adoption of improved technologies and increased productivity should, therefore, be removed, whether imposed by codes of government, regulations of unions, collusion of managements, or inertia of workers. Unless there are compelling social justifications such restrictions must be judged harmful to the whole economy.

4. Numerous other measures could contribute substantially to increased and increasingly stable construction activities. Space remains only to stress the importance of careful consideration for the use of credit facilities as a means of stabilization. In recent years the establishment of the Federal Housing Administration provided a needed stimulus to mortgage lending in the field of housing. The modern pattern of long-term mortgages, providing for regular amortization as well as interest, should be a steadying factor in periods of liquidation. However, there appear to be further possibilities for using credit facilities as a brake when construction activity threatens to climb beyond a level that can be sustained. If public and private lending agencies could devise sound means for raising mortgage rates, increasing downpayment requirements, shortening amortization periods and basing value appraisals upon normal rather than inflated costs, they might exert a healthy influence against the tendency of the construction bubble to inflate until it bursts.

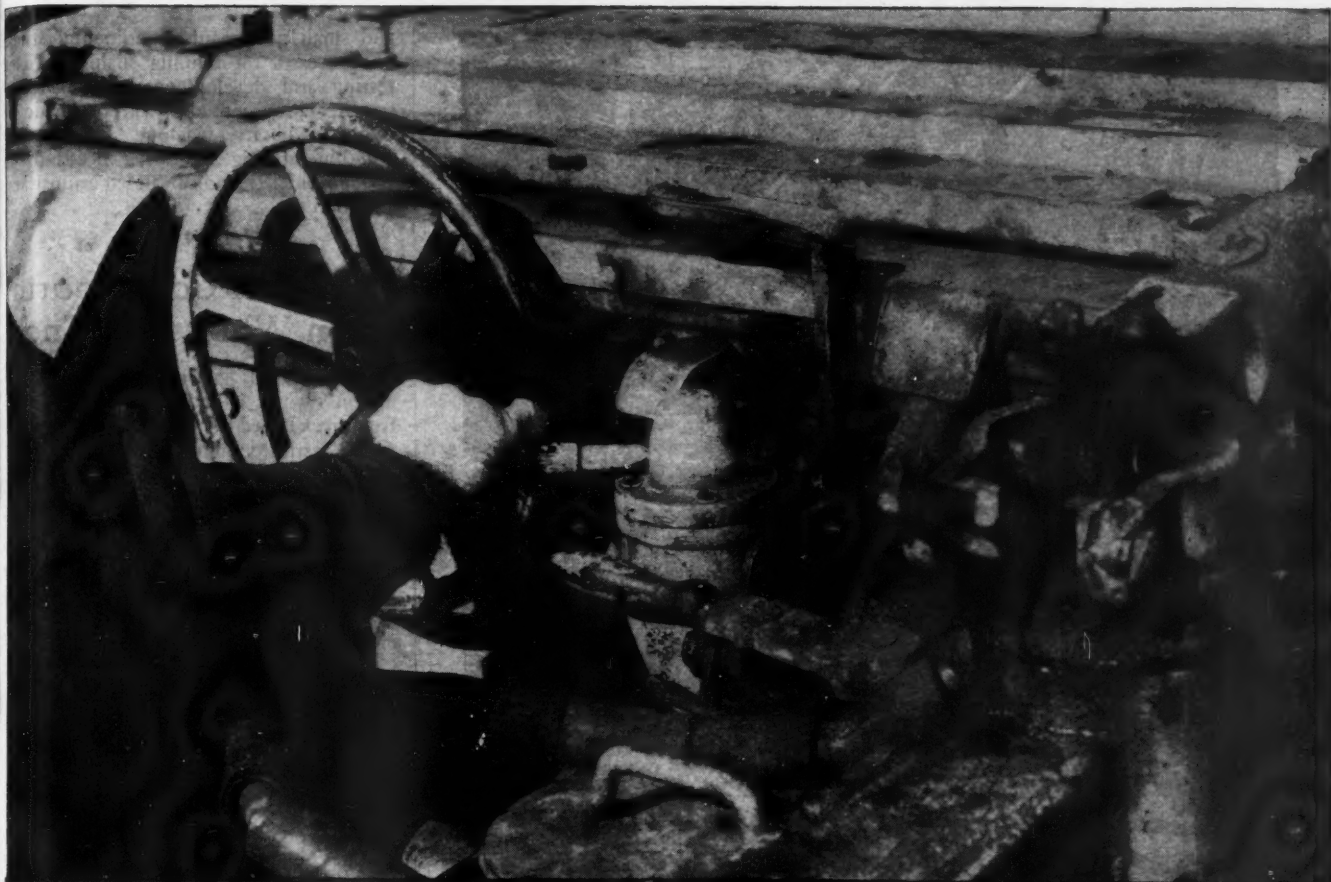
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There is no royal road to sustained high level employment. There is not even a single path to assured construction stability—there are many paths, all strait and narrow and all paved with bruising cobbles. This is true for all other major segments of industry.

It is easier to seize upon a magic formula such as monetary control, or deficit spending, or any one of a score of others, than to undertake an intricate task of piecemeal exploration. But only the latter course will lead to prosperity.



President, McGraw-Hill Publishing Co., Inc.



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**without WESTINGHOUSE HYDRAULIC BRAKES**

**Some food for thought**

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- 4** Shocks to mechanical and electrical apparatus greatly reduced.
- 5** Less sand required . . . better rail contact cuts power loss and overheating.

The final step in mechanization—and a highly important one—is to *modernize your locomotive braking system.*

Westinghouse Hydraulic Brakes increase the utility of mine locomotives: Heavier loads can be safely hauled at higher speeds. Spotting is quicker and more accurate. Gathering is accelerated.

The operator has positive, dependable control of the locomotive at all times. Merely moving the brake valve handle gives graduated braking pressures, and instant application and release.

Westinghouse Hydraulic Brakes can be installed on existing locomotives. No change in the rigging is required; hand brake and levers are retained. Send for circular S.P. 9092.

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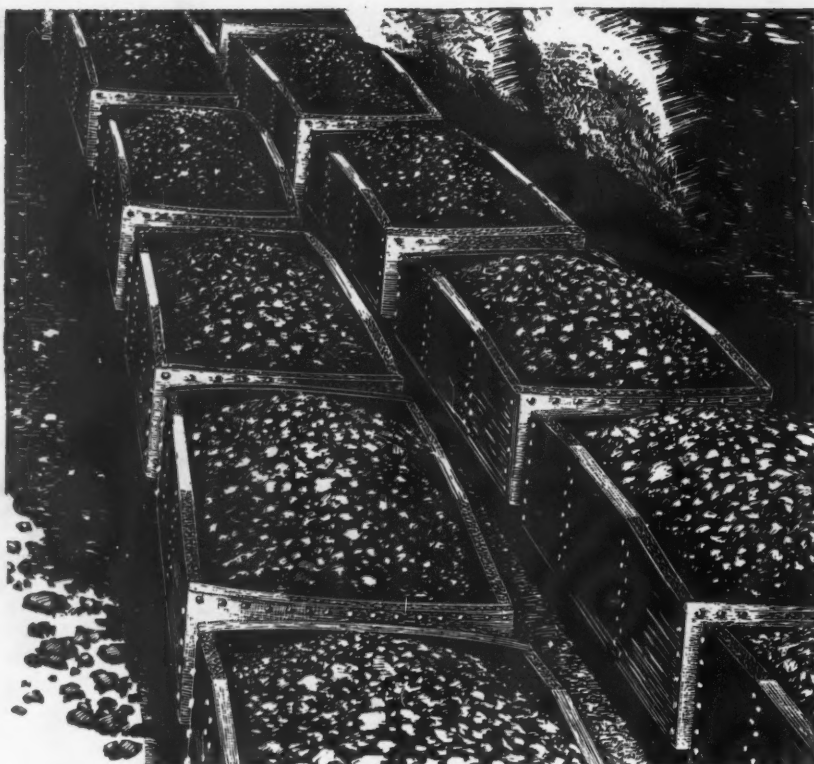


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*Welding*

and small pilot-plant experimental studies on processes for refining shale oil, retort testing and development, and other research. Provision also will be made for offices, a library, machine shop, drafting and blueprinting and other needs of the 70 additional technical and administrative employees.

## Warns of Coal Dearth Even When War Ends

Warning was given April 25 in Washington by the Combined Production and Resources Board that with the liberation of many destitute millions in war-devastated areas acute shortages confront the United Nations, particularly in coal, textiles and trucks. Such shortages are so severe and widespread as to affect the building of the kind of economic conditions upon which a secure peace can be founded. The effects of these scarcities also will be felt by civilians in the United States, Britain and Canada. The statement was issued by the Rt. Hon. Oliver Lyttleton, British member of the board and Minister of Production in London; C. D. Howe, Canadian member of the board and Minister of Munitions and Supply in Ottawa, and J. A. Krug, U. S. member of the board and chairman of the War Production Board in Washington. The problems of food shortages in liberated areas are being considered elsewhere as they do not fall within the jurisdiction of CPRB.

C. P. Potter, Deputy Solid Fuels Administrator for the U. S. and chairman of the Combined Coal Committee of CPRB and the Combined Raw Materials Board, reported that despite freeing of the Ruhr, Saar and other important coal-producing areas, Europe, after going through one of the coldest winters in history, has little prospect of being warmer next winter. Besides discomfort, Dr. Potter emphasized that industry and transportation are drastically limited because of power deficiencies, due, in turn, to lack of coal.

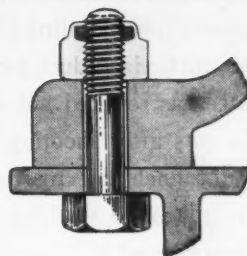
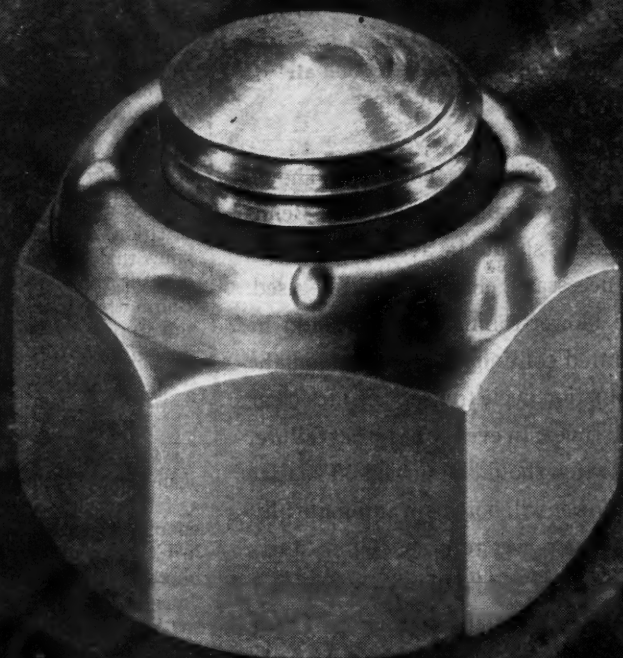
### Revivals Depend on Coal

In a statement after the meeting, Mr. Lyttleton said: "Revival of the cotton textile industry in Europe, like the revival of so much else, depends upon coal. Here again we are facing a world shortage which is under continuous study by the London and Washington coal committees which are joint bodies of CPRB and the Combined Raw Materials Board. The coal supply problem has been increasingly difficult since D-day because of the new and increasing demands of the liberated areas and of war production in the U. S. A. and U. K. At the end of March, stocks of coal in both the U. K. and the U. S. A. were down to less than one month's supply. In spite of all difficulties, however, the coal committees, in collaboration with the supplying countries, have succeeded in meeting substantially all military requirements.

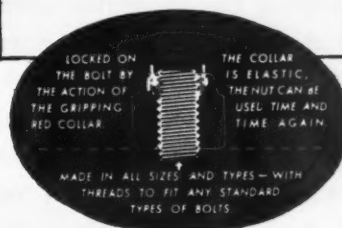
"But the future position is most serious because SHAEF's requirements for northwestern Europe will increase sharply and there are growing demands for the Mediterranean. Here again the U. K. has exported a large quantity of coal to north-

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*for Keeps*



Elastic Stop Nuts have been successfully used for hold-down bolts where security is vital. They give a positive fastening wherever there is vibration, impact, shock, stress change. Let us send an application engineer to discuss the Elastic Stop Nut way of avoiding nut failures that may be a costly maintenance item.



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The tough but resilient elastic collar forms itself to the individual bolt threads, grips them so tightly that the nut won't loosen up or back off even under the severest vibration.

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Once on, an Elastic Stop Nut stays on. And it can be used over and over again without losing the grip of its headpiece.

Result: Economy in production and economy in use.



# BOOST PRODUCTION

## with approved ventilating methods

By W. E. BROWN  
Member, American Institute  
of Mining Engineers

AMERICAN MINE OPERATORS to-day are becoming more and more conscious of potentially dramatic production increases through better ventilation. The efficient use of blower-tubing systems incorporating Du Pont "Ventube" rubberized duct for clearing the face has resulted not only in time-cycle cuts after shooting, faster extension of tunnels and crosscuts, but also better all-round working conditions for employees.

Connected to a fan of adequate capacity and with permissible motor, "Ventube" conducts fresh air to the face rapidly and helps make it possible to maintain maximum spacing between crosscuts consistent with mine regulations—in contrast to the relatively short distances permitted by other ventilating arrangements.

Knowing these potential advantages, many operators have extensively studied the methods of using "Ventube" systems known to produce the best results. In practice they rigidly follow approved methods and local mine laws and regulations. For example, the blower should be set in a secure position at least 15 feet upstream from the room neck or last crosscut. The air supply must be ample—usually  $2\frac{1}{2}$  times the capacity of the blower. "Ventube" should be suspended from the roof by messenger wire. Tubing suspended in this manner cannot be damaged by men, gob and



"Ventube" delivering good air  
at the working face.

moving equipment. The tubing should be kept as straight as possible. Bends and kinks should be avoided. If bends are necessary, elbows should be used. The blower-tubing system should be operated continuously throughout the production cycle to keep the face clear at all times. In event of a power failure, the switch should be turned off so that the blower will not go on automatically when the power returns. Before starting, the area should always be checked for presence of dangerous gases. These must be removed by approved methods before the blower is started.

\* \* \*

"VENTUBE" is Du Pont's registered trademark for its flexible, rubberized ventilating duct. It is used by many operators to save costs and boost production. For more details on the effective use of "Ventube" and for help in planning blower-tubing systems, just write: E. I. du Pont de Nemours & Co. (Inc.), Fabrics Division, Fairfield, Connecticut.



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... THROUGH CHEMISTRY

BUY BONDS AND KEEP THEM!

western Europe for military and essential civilian purposes and, in addition, large quantities have been shipped to the Mediterranean for like purposes from South Africa, the U. K. and the U. S. A.

"Exports to liberated areas can be continued only with great difficulty. Essential war and civilian uses in the U. K. and U. S. A. already need practically all of the coal it is possible to gain with the present diminished labor force and equipment. Requirements will go up. The needs of Norway, Denmark and the Netherlands will soon be added to those of the rest of liberated Europe. There is some hope of relief to the immediate problem in Europe from the pits of Aachen, the Saar and the Ruhr, but we cannot count for some months ahead on substantial amounts being available beyond what is needed by the military to the end of the war.

"The board is in close touch with the military authorities regarding the possibilities of increased European production and future requirements. As information on these points comes in, the Washington and London coal committees, aided by their national agencies, together will continue to try to find ways to meet the critical situation. In this connection, I am glad to know that Dr. C. J. Potter, American chairman of the Washington Combined Coal Committee, will shortly be visiting Britain and Europe. The board warmly welcomes such visits of experts with a view to getting the fullest production."

### Ruhr Mines Again Active

Mines in the Ruhr were in operation again April 26, and it is hoped that within a few months they will be producing enough for all the Allies' military needs in Germany as well as eventual supplies to liberated countries. The mining is being done by Germans under the supervision of the Sixth Engineers' Special Brigade. The Ruhr field is being divided into districts under supervision of American, British, French, Belgian and Netherlands mining engineers.

Production was severely cut by the Allies' bombings of nearby industrial plants and by disruption of the railroads, but American officers reported negligible damage from artillery fire, which caused fires in some large coal beds west of the Rhine. More than 1,000,000 tons of coal was found in stockpiles by advancing Allied troops.

### Personal Notes

DAVID L. COSSLETT has resigned as superintendent of the Alden Coal Co., Alden, Pa.

JOSEPH L. REYNOLDS, foreman for the last ten years at Truesdale colliery of the Glen Alden Coal Co., Nanticoke, Pa., has retired. He had previously served as superintendent at the Pettebone, Storrs and Woodward collieries of the company.

GEORGE MORGAN has been transferred from foreman at Bliss colliery of the Glen Alden Coal Co., Nanticoke, Pa., to outside foreman at the company's Truesdale colliery, Nanticoke.

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*guarantees exactly the  
right shovel required  
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BIG FIST Brand Coal  
Shovels are job-fitted  
shovels . . . especially  
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with minimum amount of labor by the miner who uses  
them. These specialized coal mining shovels are made  
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Adds 30% and MORE  
STRENGTH where 65%  
of handle breaks occur.







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**Fall of Slate  
Fatal to Two**

Three Others Missing  
In Mine

—Two workers were killed early today and three others were still trapped tonight in a fall of tons of slate in the mine.



**Prevent**

**LOST-TIME  
ACCIDENTS  
AND  
FATALITIES**

It pays dividends to specify Duff-Norton Mining Jacks . . . dividends in lives saved, accidents avoided . . . and prevention of lost production.

You can count on Duff-Norton Jacks to hold up under severe conditions and heavy loads. Safe, dependable and efficient, Duff-Norton Jacks are built to give you strength, power, easy operation and long service life.

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**Alex Grant**

ALEX GRANT, since last summer general manager of the Boulder Valley Coal Co., operating in Colorado, has become general superintendent of the Buckeye Coal Co., Nemacolin, Pa. He was for five years with the Rocky Mountain Fuel Co., Denver, preceding which he was for ten years assistant superintendent at Federal No. 1 mine of the Koppers Coal Div., Grant Town, W. Va., and served two years as manager of the Maiden mine of the Kelleys Creek Colliery Co., Morgantown, W. Va.

JOHN C. DUKES has been shifted from Huber colliery of the Glen Alden Coal Co. to the Wanamie breaker, Wanamie, Pa., as breaker boss, vice Alfred Stortz, transferred.

EDWARD A. ERICKSON, mechanical engineer, has been named to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of fuels research. A graduate of Polytechnic Institute, Brooklyn, he formerly was associated with the U. S. Navy Bureau of Ships, New York Navy Yard.

ROBERT J. SCHULTZ, Latuda, has been appointed deputy State coal mine inspector in Utah. He will be stationed in Carbon County.

RICHARD MAIZE was approved April 24 by a State Senate committee as nominee to continue as Secretary of Mines of Pennsylvania.

JOHN H. JONES, formerly president of the Bertha Consumers Co., has joined the Six States Coal Corp. and Jones, Inc., as consultant. The mines operated by these interests are expected by Mr. Jones to increase production greatly by early fall.

C. J. FLIPPEN, for the last 16 years safety director of the Fuel Department of the Norfolk & Western R. R., has resigned to become labor commissioner of the Kanawha Coal Operators Association.

JAMES LEWIS, who for several years has been superintendent of Kincaid No. 8 mine



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reduce wear, cut maintenance costs,  
help insure maximum tonnage

**H**ERE'S why Gulf oils and greases should have a prominent place in your plans for increased tonnage and lower maintenance costs: These quality lubricants have superior lubricating value and longer life—two important assets that help prevent excessive wear, down time, and below-par performance of mine equipment.

Another important plus value you get when you use Gulf lubricants is the helpful counsel of Gulf Service Engineers, specialists in scientific coal mine lubrication. From Gulf's complete line, these trained lubrica-

tion engineers recommend a quality lubricant of the proper type and grade for each machine and moving part. In many cases they also suggest better methods of application, which not only insure better lubrication, but help improve safety records.

The helpful counsel of a Gulf Lubrication Service Engineer—and the Gulf line of more than 400 quality oils and greases—are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office today.

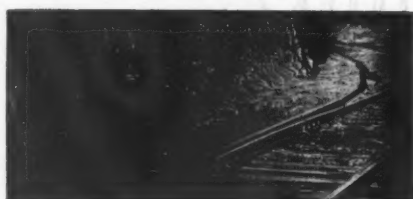
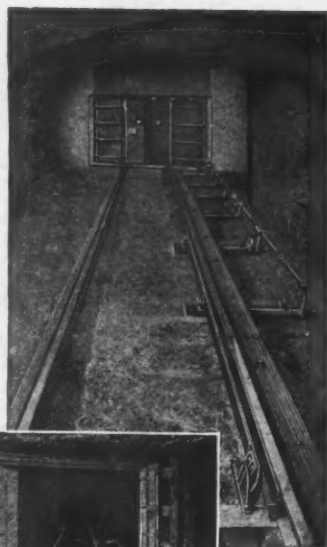


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Increase Tonnage!*

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requires no attendant—opens automatically in a split second and closes same way when last car has passed—no slowing down on approach—thus trips are speeded up. Mechanical action is fast and positive. Air flow is maintained at constant speed to carry off accumulated gas.

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... does everything a switchman can do and does it faster with safety. Automatically throws switch points ahead or behind trip—or both. Trip maintains full speed. Switch can be operated by motorman, remote control or by hand and is adapted for use with automatic DERAILER.

**SIGNALS** ... warn interfering trips and clear the way for non-stop main line trips. Prevent collisions and enable all trips to move with safety and speed.

These automatic devices make for perfect coordination of loading, transportation and tipples by eliminating lost time and speeding trips efficiently and safely. Our sales engineers will be glad to inspect and recommend installations that will save man hours, improve safety—no obligations. Canton devices pay for themselves—quickly. Complete catalogues on request.

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of the Peabody Coal Co., Tovey, Ill., has retired from active service.

ALFRED STORTZ, breaker boss at Wanamie colliery of the Glen Alden Coal Co., Wanamie, Pa., has been made foreman at Bliss colliery, vice George Morgan, transferred.

ALEC COLQUHOUN, superintendent of Cass No. 48 mine of the Peabody Coal Co., Cass, Ind., has been transferred to Kincaid No. 8 mine, Tovey, Ill., where he succeeds James Lewis, retired. Mr. Colquhoun has been with the company more than 30 years, for many years in the engineering department at Taylorville, Ill., before taking charge at No. 48 mine.

CLYDE S. KELLUM has been appointed general superintendent of mines by the Boothton Coal Mining Co., Boothton, Ala. Formerly he was connected with the McAlester Fuel Co., McAlester, Okla., and with the Southern Coal & Coke Co. for a number of years when it owned and operated the Boothton mines.

WILLIAM A. TINSLEY has been named assistant superintendent and safety director by the Boothton Coal Mining Co., Boothton, Ala. Formerly he was connected with the McAlester Fuel Co., McAlester, Okla.

STAFF SERGEANT ERNEST PURSIFULL, former coal miner, of Colmar, Ky., is on duty at a field installation of the Chinese Combat Command under Major General R. B. McClure. Working closely with Chinese armies, divisions and smaller units under General Ho Hing-chin, Supreme Commander of the Chinese Army, Sergeant Pursifull was presented with the Chinese Grand Star of Honor upon recommendation of the Chinese general officer commanding a unit with which the Sergeant was on duty for an extended period. He entered the Army in September, 1940.

FRED D. BUCKLEY, formerly with the Foster Wheeler Corp., has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he will engage in fuels research.

DARIO PARESI has been promoted from general mine foreman to superintendent of the Cadogan mine, Allegheny River Mining Co., Kittanning, Pa.

QUINCY DUNCAN has been appointed master mechanic for the Rail & River Coal Co.'s mines, near Bellaire, Ohio.

## Attack Rate Cut On West Kentucky Coal

A suit to set aside an Interstate Commerce Commission order reducing the freight rate on coal hauled from western Kentucky to Chicago was filed March 29 in Federal Court in Lexington, Ky., by the Chicago, Burlington & Quincy; Chicago & Eastern Illinois; Elgin, Joliet & Eastern; Missouri Pacific and the New York Central railroads. The plaintiffs asked a temporary injunction suspending enforcement of the I.C.C. order for not more

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- 1** Heavy manganese steel bumpers prevent bucket from dropping on the arch. They last longer!
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*Fast*  
AND  
**TOUGH**

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*after 9 years in a mid-western coal mine!*

Four thousand gallons of "circulating water" per minute . . . with 5% solids . . . pumped against a 62-foot head for a period of 9 years! That's the proud record of this 10", Type "M" Morris Pump. Sounds impressive, but it is just typical Morris performance—the result of 81 years "know how" in coordinating design, speed and wear-resistant alloys to pump high, uniform volumes of heavy and abrasive liquids at high heads.

#### **Pressure Balanced Impeller Increases Efficiency**

Extra vanes with a larger diameter, on the suction side of the Morris impeller—an exclusive patented feature—balance the pressure inside the pump, prevents excessive circulation of gritty solids between the shell and the suction disc liner, minimizes eddy losses and leakage, and improves efficiency. This, plus Morris "Flintmetal"—a special low-chrome alloy with a Brinell hardness around 700—is responsible for the remarkable wearing qualities of the pump.

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**CENTRIFUGAL PUMPS**

than 60 days beyond April 23, when it was scheduled to become effective, and a permanent injunction holding the order null and void.

The I.C.C. order, handed down Dec. 22, provides that a rate differential for western Kentucky coal over that of southern Illinois be reduced from 35c. a ton to 25c. The railroads charged that the new rate would be unduly preferential to western Kentucky mines and prejudicial to the southern Illinois operations and that the I.C.C. order "is illegal, arbitrary, unreasonable, beyond the power of the commission and therefore void."

The effective date of the order has been set back to June 1.

### **Leckie Tipple Burns**

The tipple of the Freeburn mine of the Leckie Collieries Co., Alex, Ky., was destroyed by fire April 9, causing a loss of \$50,000 and halting production. Work is to start on a new structure as soon as the necessary material can be obtained.

### **Allegheny River Co. Starts Postwar Plans**

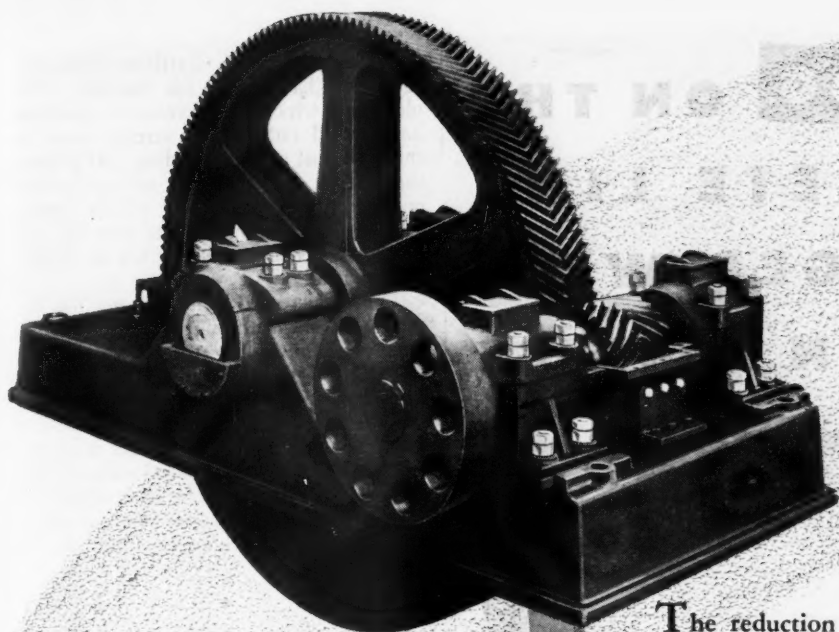
Considerable work has been done by the Allegheny River Mining Co., Kittanning, Pa., on development of Mahoning mine, a postwar project. For this the company has purchased 2,000 acres of Upper Freeport seam averaging 40 in. thick and ranging from 34 to 44 in., on Mahoning Creek near its junction with the Allegheny River and the last remaining large field in this area. The mine will be served by the Pittsburgh & Shawmut Ry., which will build a branch across Mahoning Creek and project it up a deep ravine to the tipple site.

The seam will be opened at an elevation 300 ft. above the railroad track at the tipple. Grading has been done on an access highway 6,000 ft. long and on a 10-percent grade coming down the mountain from a public highway which is 600 ft. above the tipple site. Half way down on this new road, at the coal-seam elevation, a deep ravine was filled to make a level area for the mine openings and service buildings. Excavation for the road and for the mine-opening area totaled 80,000 cu.yd., but much of it was only side casting.

#### **Mine to Last Over 30 Years**

With the coal now owned and available, 30 to 40 years' life is in view for the mine. While most of the civil engineering work has been done, much of the mechanical engineering design of the buildings and tipple is unfinished.

Widnoon mine is the new name of the old Chickasaw mine of the Allegheny River Mining Co. The new opening, near Widnoon, Pa., is in the lower Kittanning seam and at the extreme end of the old property where the coal is of a higher quality. The new openings, made in



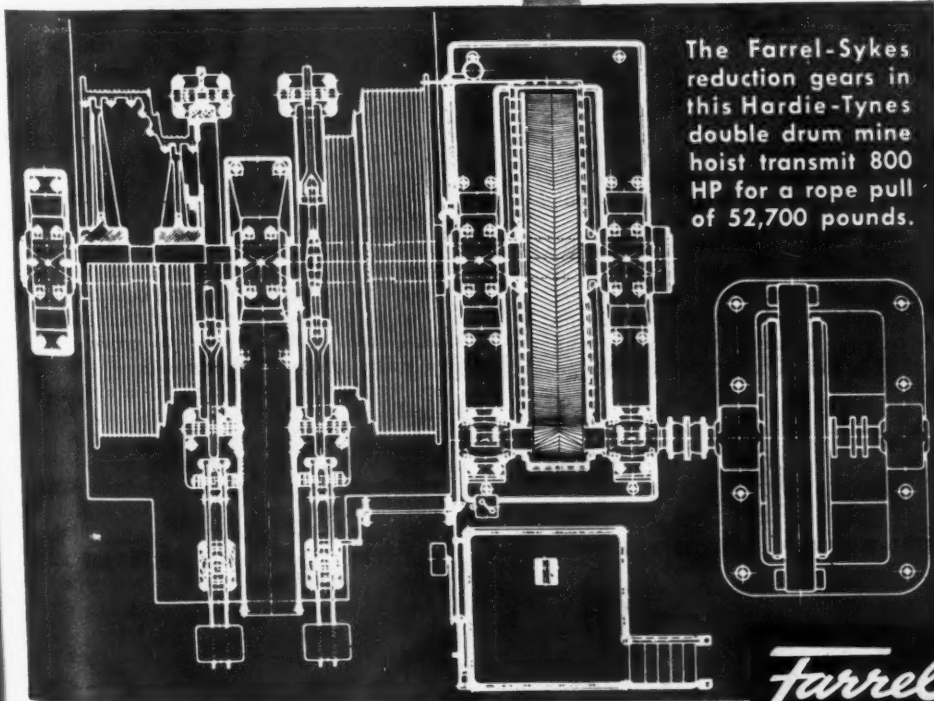
# HOW DOES BACKBONE FIT INTO MINE HOIST DESIGN?

The reduction gears in this Hardie-Tynes mine hoist are the Farrel-Sykes continuous tooth herringbone design — the famous *Gear with a Backbone*. Their features of design and precision manufacture assure dependable performance, continuous operating efficiency and maintenance economy.

The *backbone* formed by the juncture of the two helices, without a center groove, puts the entire face to work and provides extra strength and high load-carrying capacity. Precision generation by the Farrel-Sykes process makes these gears exceptionally quiet and smooth running, even at high speeds.

Overlap or interlacing of the teeth, gradual engagement and inclined line of pressure distribute the load on the teeth uniformly, reducing wear and maintaining correct tooth action throughout a long gear life. Opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machine.

For further information on Farrel gears and gear units, send for a copy of descriptive booklet No. 438.



The Farrel-Sykes reduction gears in this Hardie-Tynes double drum mine hoist transmit 800 HP for a rope pull of 52,700 pounds.

Above — A typical Hardie-Tynes mine hoist drive with Farrel-Sykes continuous tooth herringbone reduction gears.

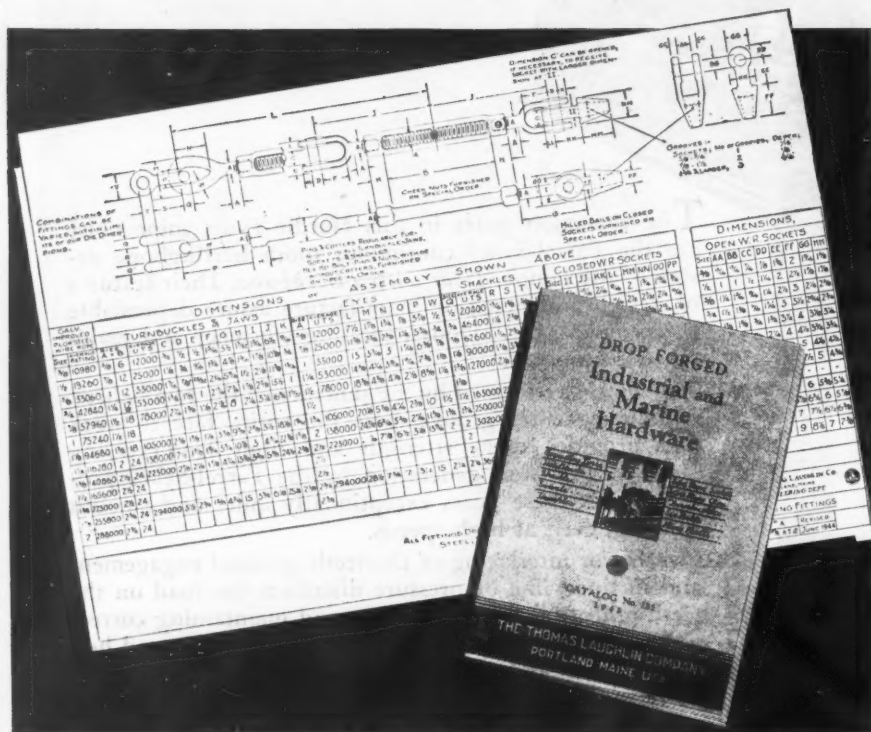


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# NEW CATALOG ON THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



## NEW ITEMS...NEW ENGINEERING DATA SIMPLIFY SELECTION OF THE RIGHT FITTINGS

To simplify your job of selecting the right combination of fittings for any wire rope or chain assembly... Laughlin's new Industrial and Marine Hardware Catalog No. 135 is now ready.

This catalog displays every item in the most complete line of drop-forged wire rope and chain fittings on the market. New items have been added since the last catalog was published — and your nearby mill, mine or oil field supply house is taking orders for them.

New engineering data and tables simplify such problems as picking the right hook for a specified rope or chain size and safe load... the right products for a turnbuckle assembly with shackles or sockets... and many others.

Your file of vital buying information will not be complete until you have this handy catalog at your finger tips. Write on your business letterhead for your copy of Catalog 135. Dept. 6, The Thomas Laughlin Co., Portland 6, Maine.

# LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



1944, use Joy loaders, shuttle-car gathering, then belt haulage to the outside. The old mine, which in its years of operation has worked out a large acreage, was for the most part on hand loading. At present the output of this new full-mechanical operation is being trucked to the tippie. When its development cuts into the old mine it is the plan to switch to underground haulage.

The Allegheny River company has engaged the Williamson Shaft Contracting Co., Columbus, Ohio, to sink an air shaft 320 ft. deep into the Cadogan mine. It is to be lined full depth with reinforced concrete, 10 ft. finished inside diameter. It will be an upcast and the present mine fan will be moved to that surface location. Another fan to be installed in conjunction will serve as an auxiliary for any emergency which might arise through failure of the other fan.

## Federal Aid Sought For West Canada Coal

Government assistance must be given in the recovery of former market areas for western coal, said a brief of the Western Canada Bituminous Coal Operators' Association presented April 3 at Calgary, Alta., to the Carroll Commission on coal.

To insure reasonable operating time in mines, the association said it was essential that operators should be assisted in the recovery of former market areas by:

1. Government assistance in the form of stable conventions.
2. Cooperation of the Federal Government authorities and by operating representatives appointed to any direct control authority that may be set up or continued.
3. Cooperation of the Provincial Government through the Lands and Mines and Trade and Industry departments.
4. Cooperation of the railways in extending the use of western coals to at least the areas in which they have formerly been used and in the continuation of a policy of orderly purchasing of supplies as this affected the proper spread of working time in mines.

### Seek Full Time Jobs

"If, as is indicated in so many public pronouncements, government policy now is to be directed toward provision of full-time employment, then it becomes obvious that if the western bituminous coal industry is to be considered as part of this general plan, steps must be taken to provide the necessary market and tonnage to guarantee reasonably full-time operation and employment," the brief said.

In summary, the brief said there was no lack of reserves at operating mines and the full productive capacity had never been fully utilized.

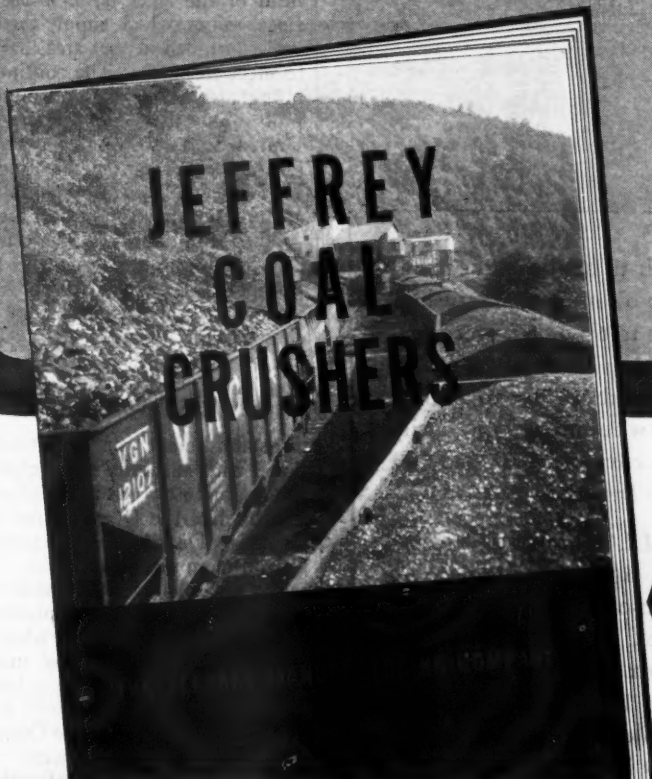
"The problem is one of markets," the brief said. "The railways provide the real market, with secondary operations, general industry and commercial needs only a minor percentage.

"Wartime changes have compelled a westerly movement and again brought United States coal into the Prairie Provinces."

# PROPER SIZING WILL BE A POST-WAR REQUIREMENT

The demand for uniformly-sized coal will be resumed after the war on a scale far greater than pre-war requirements. Is your mine prepared to meet this demand? This new catalog offers valuable assistance and information to help you select the right type and size of crusher to suit your particular kind of coal. Whatever size or range of sizes you wish to make, this catalog gives you the answer . . . simply, quickly. There is no guessing

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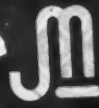
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C. D. Howe, Minister of Munitions and Supply, speaking in the Canadian House of Commons, early in April made the following remarks anent coal:

"Consumption of coal in Canada during the calendar year 1944 was approximately 45,000,000 tons, compared with a pre-war consumption of 26,000,000 tons. Of this amount we had to import 29,000,000 tons. Reduction of output from our own mines in the Maritimes and decreased imports from the United States have created a short supply position in both commercial and household fuels from the Atlantic coast to the head of the Great Lakes.

"However, we have been able to substitute coke for anthracite coal, and to solve, to a degree, the heating problem of the household. To add to the problems created by short supply, we have had transportation difficulties and severe manpower shortages among the distributors. We have tried to meet these various problems by regulating both the quantities and types that may be delivered to each household. I think I may say that these control measures have prevented any cases of hardship.

"Fortunately, the situation west of the head of the lakes has not been so acute. Local mines, which supply the bulk of the coal consumed in that area, have been able to meet all needs. The continued reduced output from our eastern mines and the probability that our imports from the United States will suffer a further reduction indicate that the heating season of 1945-46 will present a problem just as acute, if not more so, than this year."

The Munitions Minister warned March 29 that, regardless of when the war in Europe ends, Canada will be short of coal next winter and appealed to citizens to conserve fuel by letting furnace fires die out as soon as the weather permits.

### Urges Naming Fuel Board

Establishment of a Dominion fuel board with authority to regulate and assist the coal industry was recommended April 4 in a brief of the United Mine Workers of America, District 18, presented to the Carroll Commission on Coal. The miners said they favored a national fuel policy with establishment of voluntary central selling agencies. The Federal Government should assist the coal industry, they said, by freight subventions lasting for at least ten years and sufficient to allow Alberta coal to move into the Ontario market. Other recommendations were:

That larger consumers of coal, by orderly planning and marketing, estimate their needs so as to eliminate spasmodic operation of mines.

That the "closed camp" system be abolished in mining centers and the residents be allowed to build their own homes. Mining communities, they said, should be properly planned and modern drainage and sewage systems installed.

That a welfare fund for the benefit of miners be established out of royalties on coal.

That a pension scheme be established to cover employment within the industry rather than with one particular employer.

The brief said U.M.W.A. was opposed

# Introducing KENNAMETAL UNDERCUTTER BITS



**FOR USE IN MOST  
STANDARD CHAINS**

*The unique cemented carbide that revolutionized metal-cutting is now available to the mining industry in a special, tough, hard grade that forms the brazed-in cutting-tips of these advanced designs of cutter bits.*

Kennametal-tipped Undercutter Bits are now available for high production operations in deep, and strip mines. These revolutionary new bits, with cutting tips of hard, durable Kennametal brazed into sturdy drop-forged alloy steel shanks, have been thoroughly pretested for months in many coal mines. The experience of users shows that:

*Kennametal Undercutter Bits increase the lineal footage that can be cut without stopping operations for bit replacement. They can be resharpened a score or more times, thereby effecting substantial reductions in tool costs. Their use reduces power consumption per footage cut, and makes possible operations where previously they were impracticable.*

\*Kennametal is exceptionally tough and hard (75 to 76 Rockwell C compared to 66 to 67 for hardest tool steels). That's why it keeps its edge—and that's why mining machines tooled with Kennametal-tipped bits can cut more coal at less cost.

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1 1/4" fixed gage—for Cincinnati, Goodman, Jeffrey, Prox, Sullivan, and Tracy cutter chains on short and long wall machines.



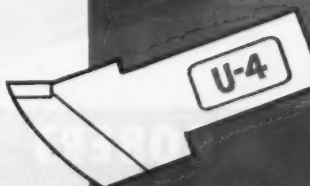
**U-2**

1 3/8" fixed gage—for Goodman Numbers 50, 52, and 54 cutter chains.



**U-4**

At 1 3/4" gage—for thin cutter bars; and at 2" gage—for thick cutter bars on Cincinnati, Goodman, Jeffrey, Prox, Tracy, and Sullivan cutter chains in track and mobile machines.



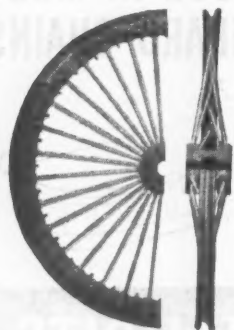


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Four point setting. In designing Holmes' all-steel cages, first consideration is given to proper distribution of the load, so that the weight is transmitted directly to the lower bail members.

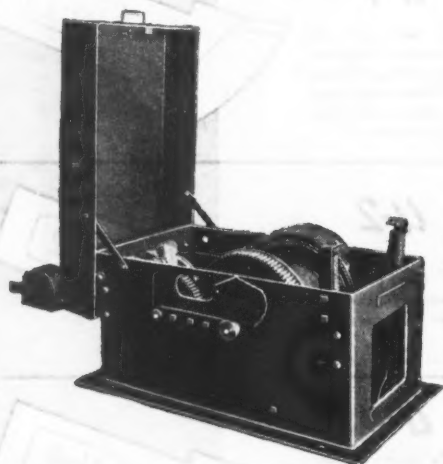
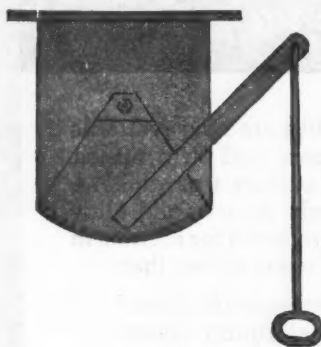


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## Holmes Bin Valves

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to "the placing of a premium on the development of uneconomic properties at low wage rates."

Under the suggested ten-year freight-subsidy policy, only coal suitable for shipping and storage would be allowed to enter outside markets like Ontario. Coal not suited for outside shipment should be given preferential treatment in the home market.

The suggested fuel board could encourage the establishment of central selling agencies, supervise and standardize the grading and sizing of coal, recommend the manufacture of coal byproducts and eliminate waste and duplication of services.

Provincial Resources Minister J. L. Phelps proposed April 21 before the Carroll Commission the establishment of a Dominion Coal Board with wide powers to control production and marketing. Such a board, he said, would be more effective in solving coal problems than independent provincial bodies, but if the Dominion failed to "take the lead in adopting a firm policy directed at stabilizing the coal industry, Saskatchewan will not hesitate to act on its own.

## Lignite Handicapped

Reading a brief presented by the Saskatchewan Government, Mr. Phelps said Saskatchewan lignite, being low in the scale of heat values, did not have sufficient geographical advantage over higher-grade western coals to allow its entrance into eastern and central Canadian markets now supplied with imported coals. Saskatchewan lignite had a natural geographical advantage in relation to heavily populated areas of Saskatchewan and Manitoba and this advantage should not be jeopardized by the application of subventions or other measures aimed at making Canada self-sufficient in respect to fuel requirements.

Wartime controls and assistance could not be abruptly terminated without serious damage to the industry, he said. If the Federal Government were to continue subsidizing the coal industry, then it should be able to demand that "a large measure of control over the industry be placed in the hands of the government to insure that public moneys used to bolster this industry are expended in the best interest of the whole Canadian people."

If the industry could only be adequately maintained by a "wide application of the unsound policy of the use of extensive permanent subsidies, then there would appear to be a good argument for the complete nationalization of the Canadian Coal industry."

## Obituary

JAMES W. PAUL, 73, president of the Big Creek Winifrede Coal Co., operating in Pike County, Kentucky, and director of the research laboratory of the Mine Safety Appliances Co., died April 15 in St. Francis Hospital, Pittsburgh, Pa. Specializing in mine rescue, first aid, safety lamps and roof support, he was responsible for improvement of oxygen-breathing equipment and developed an oxygen-breathing machine known as the Paul

# STRIP MINERS

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Two of the more than 50 Bakers in the Pittsburgh district. Model 338-A Baker Gradebuilder on an Allis-Chalmers HD-14 diesel tractor stripping for Maraco Coal Co., Imperial, Pa. Model 351 Baker Gradebuilder on Allis-Chalmers HD-14 tractor at Imperial, Pa. mine of William Alee Coal Company. Over 125 strip mines use Bakers.

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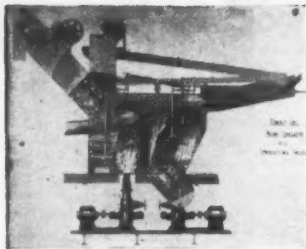
BULLDOZERS SNOW PLOWS

# BAKER

CONSTRUCTION EQUIPMENT

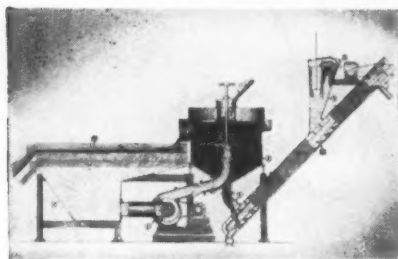


# PRODUCE *Better Coal* AT LOWER COST... WITH R and S MODERN EQUIPMENT



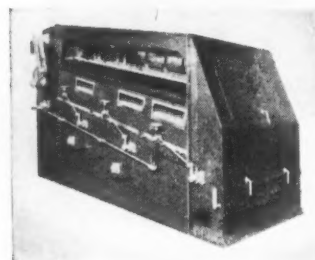
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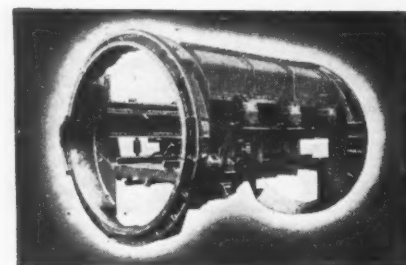
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apparatus. He organized the mining department of the State of West Virginia and later had charge of the mine rescue and lighting division of the technologic branch of the U. S. Geological Survey, afterward taken over by the U. S. Bureau of Mines.

JAMES LEICHTY, 74, superintendent of Middle Fork mine of the United States Fuel Co., Benton, Ill., was fatally injured April 2 when struck by an automobile.

THOMAS MORGAN JR., 52, general superintendent of the Raleigh division, New River Co., died April 7 at his home in Beckley, W. Va. With New River since 1942, he began his career in 1912 as an engineer for the McKell Coal & Coke Co. Since then he had been with the New River Collieries Co., E. E. White Coal Co., C. C. B. Smokeless Coal Co. and the Koppers Coal Div.

ROBERT J. MINK, mine foreman for a number of years at the Sayreton mines, Republic Steel Corp., Sayreton, Ala., died March 25 at his home, near Brookwood, Ala.

GEORGE WARD, 54, secretary of the Harlan County Coal Operators Association, died April 13 at his home in Harlan, Ky., after a brief illness.

## Signs Inspection Bill; Cave Measure Blocked

A bill authorizing the State Secretary of Mines, with the approval of the governor, to appoint sufficient electrical inspectors to inspect twice each year all equipment used in gaseous mines of the State was signed April 25 by Governor Martin of Pennsylvania. The inspector will receive \$4,800 annually and expenses.

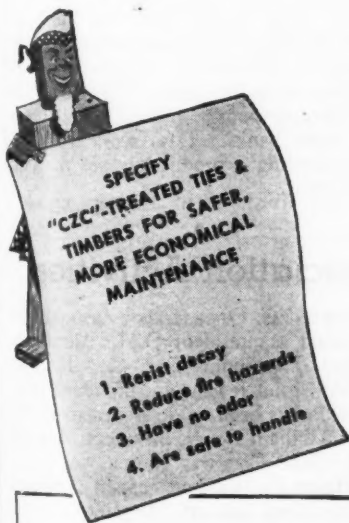
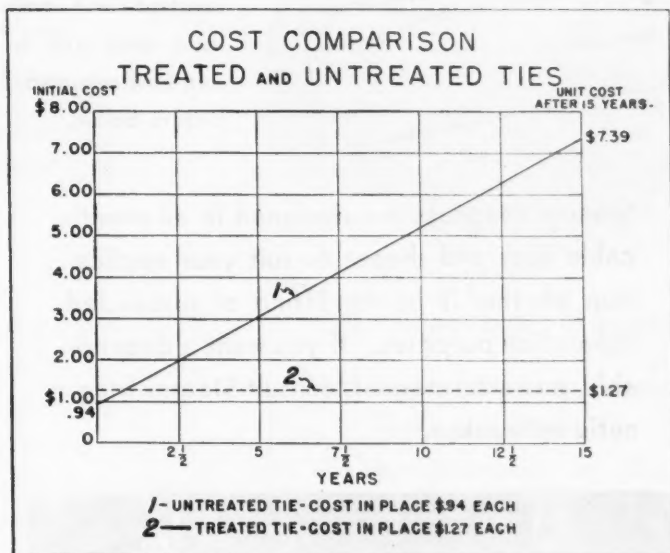
Despite House rejection April 24 of a move to bring a cave-in protection bill to the floor, anthracite region lawmakers still clung to hope for enactment of legislation to alleviate the mine subsidence problem. The committee was considering a measure that would set up a mines subsidence commission in the Mines Department, said a proponent of the bill.

## Large-Size Stokers Enjoy Preference

Production of more large size stokers (Class A, consuming 61-100 lb. of coal an hour) rather than the smaller ones (Class B, consuming less than 61 lb. an hour) was recommended by the War Production Board Advisory Committee of the Stoker Manufacturers Industry at a recent meeting. The committee reported that the larger sizes conserve more coal and utilize the limited steel available more effectively. In this connection it was said that the stokers installed in 1944—about 40,000—consumed only about 4,000,000 tons of coal, saving approximately 1,000,000 tons as against hand firing. Committee members reported a brisk demand for stoker equipment.

# When is 94¢ more than \$1.27?

The Answer is seen at a glance in the chart below. But there's much more to the story . . .



This chart is one of many in the booklet, "Wood Preservation for Mines," published by Du Pont, and sent to you free on request. It tells how your haulage ties and other mine timber may be impregnated with CZC (Chromated Zinc Chloride) to resist decay, and reduce fire hazards and operating costs over a

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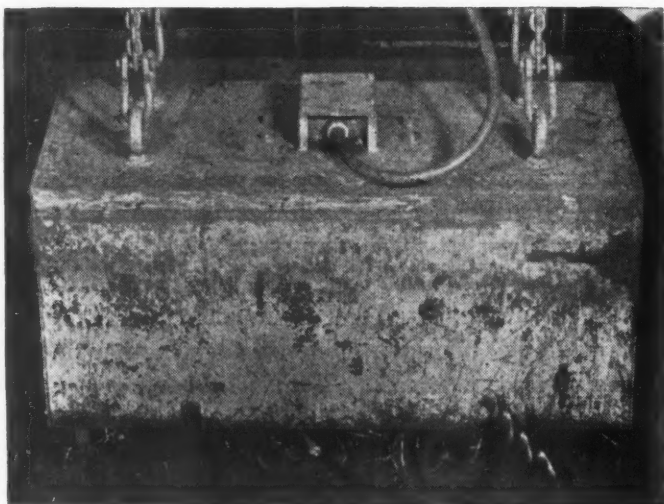
"You may be interested also to know that these magnets will replace other types magnets manufactured by other concerns."

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## Asks Funds For Strip-Mine Study

An appropriation of \$50,000 to the Department of Agriculture for an experimental study of reforestation in strip-mine areas where the land has become depleted has been asked by the Appropriations Committee of the U. S. Senate at Washington by Senator Capehart of Indiana. The proposed appropriation is to enable the Agriculture Department to conduct experiments to ascertain how the usefulness of the land might be restored.

## Tony Rose Gets Packer Colliery

Operation of Packer No. 5 colliery, near Girardville, Pa., has been turned over to Tony Rose (Pasquale Adonizio) by the East Bear Ridge Colliery Co. The mine, which employs about 570 men, was opened by the Lehigh Valley Coal Co., which abandoned it about 14 years ago. In 1939 it was taken over by East Bear Ridge.

In the future the operation will be known as the Rose Valley Coal Co. The new operator obtained the lease from the Girard Estate, which owns the land on which the mine is situated.

## Anthracite Mines Had 78,145 Men in 1944

Data now available show that in 1944 78,145 men were employed in the anthracite industry. Of these, 20,000 miners and 12,000 miners' laborers made up the productive force that mined the coal; twice as many worked inside as those employed outside. Total production for 1944 was 64,112,589 tons, of which 42,659,489 tons came from the mines; 10,925,619 tons came from strippings, and 10,527,481 tons came from banks. Days worked totaled 292, indicating a production per man-day of 2.81 tons.

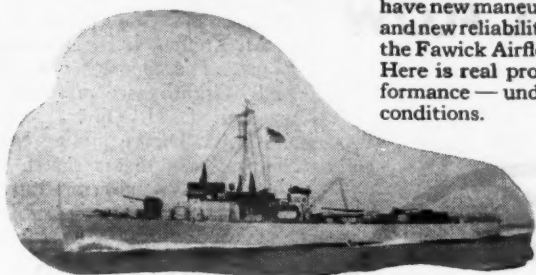
## Association Activities

POCAHONTAS OPERATORS' ASSOCIATION has elected as president O. L. Alexander, president, Pocahontas Fuel Co. He succeeds Col. John J. Lincoln, president since 1931, who has been made chairman of the board. William Beury, president, Algoma Coal & Coke Co., was chosen vice president; Henry F. Warden, general manager, American Coal Co. of Allegany County, was reelected treasurer, and W. E. E. Koepler, Bluefield, was renamed executive secretary.

BITUMINOUS COAL INSTITUTE has elected the following officers: Fred S. McConnell, president; R. H. Knode, vice president; Grant Stauffer, vice president; R. L. Ireland Jr., treasurer; J. C. Robb, assistant treasurer; J. D. Battle, secretary. H. B. Baird, vice president, Koppers Coal Div., replaces J. P. Williams Jr. on the board of directors.

# We're Looking for

# Clutch Trouble



Thousands of naval vessels have new maneuverability and new reliability through the Fawick Airflex Clutch. Here is real proof of performance—under battle conditions.



Now you can equip your heavy duty machines with a clutch that is proof against trouble.

The Fawick Airflex Clutch controls torque by air. Actually, it gives you air-cushioned power. It absorbs shock and vibration, with a clutch grip as firm, or as light, as the job requires.

This revolutionary new clutch needs no arms, levers or springs. It requires no adjustments, no lubrication. It corrects automatically for misalignment. Maintenance costs are unusually low.

The Fawick Airflex Clutch has proved itself in heavy duty service—for Diesel drives, marine and industrial, presses, rubber, paper and steel mills, hoists, draglines, cranes and shovels—wherever the going is tough.

Write us for engineering recommendations based on broad clutch experience.

**FAWICK AIRFLEX COMPANY, INC.**  
9919 Clinton Rd. • Cleveland 11, Ohio

*In Canada, Renold-Coventry Ltd., Montreal,  
Toronto, Vancouver*

*In Britain, Crofts Engineers, Ltd., Bradford, England*



## 12 Important Advantages

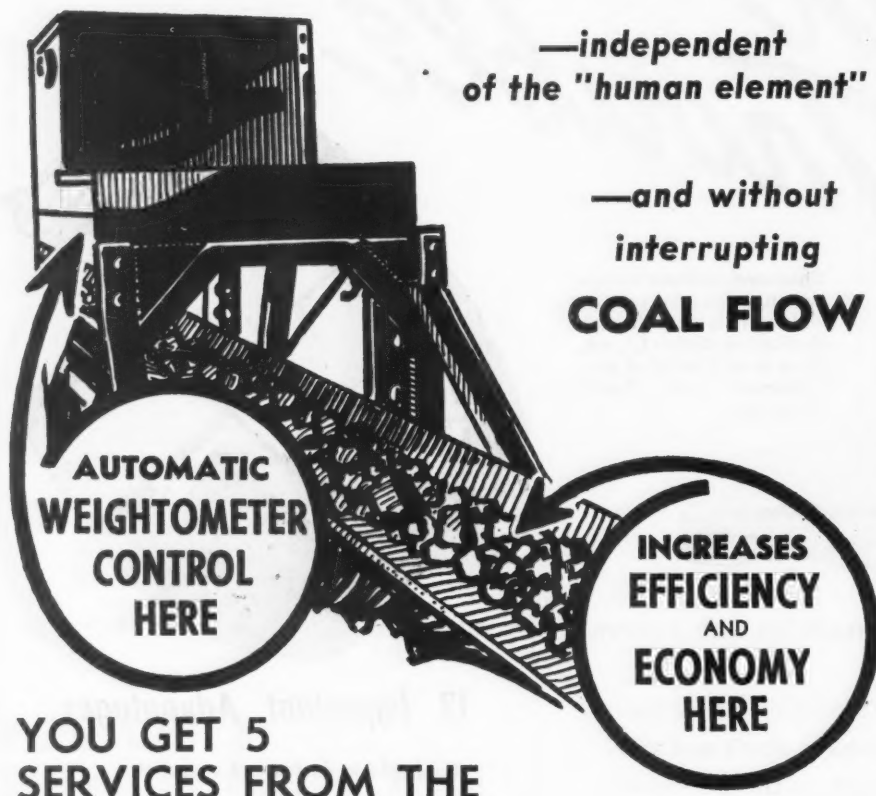
1. Simple in design and operation
2. Flexible control by air
3. No adjustments or oiling—low maintenance
4. Dampens vibration—absorbs shocks
5. Corrects misalignment automatically
6. Smooth starting—no jerks
7. Runs cooler—uniform pressure
8. Controls torque by air pressure
9. Greater capacity—more compact
10. Remote control by air valve
11. Replaces flexible couplings
12. Acts as clutch, slip-clutch, brake and coupling

# FAWICK Airflex CLUTCH

POWER CONTROLLED BY AIR



# Get a simplified, dependable 24 hour day record



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## WEIGHTOMETER

MERRICK WEIGHTOMETERS applied to BELT CONVEYORS assure accurate and speedy automatic weighing for efficient and economical control of tonnage and cleaning plant operation. Leading large tonnage producers are effecting substantial savings by using WEIGHTOMETERS for purposes of indication, registration and recording in connection with these processes:

- 1—Weighing all mine production
- 2—Weighing all coal to washing plants
- 3—Weighing coal after cleaning
- 4—Weighing waste and rejects from cleaning plant
- 5—Checking tonnage payments

Chart recorders may be located at any point remote from WEIGHTOMETERS, which may be applied to any size belt conveyor, inclined or horizontal. The WEIGHTOMETERS give a simplified and dependable 24-hour day record of your production, without a weighman and without interrupting coal flow.

Short pivoted Weightometers equipped with a magnetic pulley may be used to separate tramp iron. Merrick Engineers are ready to show you how your mine can best profit from the use of Weightometers. We also manufacture the FEEDOWEIGHT which accurately weighs coal to a mixing conveyor, controls the rate of feed and continuously totalizes the weight delivered.

WRITE FOR BULLETIN CA-375

# MERRICK SCALE MFG. CO.

173 Summer St.

★ ★ ★

Passaic, N. J. U.S.A.

★ ★ ★

VERMILLION COUNTY COAL OPERATORS ASSOCIATION was organized April 2 at Danville, Ill., with these officers: president, C. W. Thomas, Blue Lake Coal Co.; vice president, William Martin, Tilton Mining Co.; secretary-treasurer, Harvey Mauck, Deep Valley Coal Co. Raymond Ellis, Miller Coal Co., was appointed chairman of a committee to draw up bylaws.

### Glen Alden Asks Cut In Assessed Value

Seeking a reduction of \$2,475,000 in its assessed valuation for tax purposes, the Glen Alden Coal Co. has presented its case before the Wilkes-Barre City Council, sitting as a Board of Revision of Taxes and Appeals, in the presence of Mayor McCole and Councilman R. V. Rogers, L. M. Kniffen, J. B. Northrup and T. A. Evans. The company was represented by E. R. Griffith, vice president and general manager; J. H. Oliver, general counsel, and H. A. Dierks, mining engineer. The company said that a similar reduction in valuation was sought from Luzerne County.

### Gamerco Mine Promptly Reopened

Operations were resumed April 4 at the Gallup-American Coal Co. mine in Gamerco, N. M., closed down March 29 by its previous owners because of loss of markets. The new Gallup-Gamerco Coal Co. said that work had started with 50 men, but that additional men would be hired. The new owners signed a contract with the United Mine Workers. Officers of the new company include P. J. Vidal, president; S. P. Vidal, secretary-treasurer; on the board of directors with them being Dr. J. W. Hannett, Allen Rollie, and Joseph Vidal. Other members of the syndicate are Domenic Rollie and John W. Eichman.

### Potomac Power Project Rouses Loud Protest

An avalanche of protest from Senators, Representatives, land owners, civic organizations and many State and other agencies marked the public hearing in Washington April 3 before the Army Board of Engineers for Rivers and Harbors on the plans for the Potomac River Basin development contemplating the construction of 14 dams and reservoirs and an overall expenditure of \$235,000,000. In the course of the hearing, Senator Byrd (D., Va.), who strongly opposed the project, made public a letter from Brig. Gen. Kingman, senior member of the Army Board of Engineers, in part as follows: "Further hearings will be unnecessary, as the Board has decided to submit an adverse report relative to the 14 dams proposed by the District Engineer."

When completed, the Board's adverse report will be placed before Chief of Engineers Maj. Gen. Ernest Reybold, who will make a further study, then submit his

# Wyoming **RED EDGE**

## RIVETLESS SOCKET FEATHERWEIGHT



**NO RIVETS...  
SMOOTH  
SURFACE!**

*Coal Shovels and Scoops*



**BALANCE  
AND  
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**AMES PRODUCTS**  
SHOVELS  
SPADES  
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Post Hole Diggers



Red Edge Featherweight coal shovels and scoops with their rivetless, smooth surface socket and alloy steel blades, are light in weight, unequaled in toughness and famous for their ability to resist abrasive wear.

For Bituminous Coal specify Red Edge Coal Shovels and for Anthracite Coal, Red Edge Coal Scoops.

**AMES BALDWIN WYOMING CO.**

PARKERSBURG, W. VA.

NORTH EASTON, MASS.



## THE ABC'S OF **BETTER** COAL SCREENING

Leading coal plants are finding Bixby-Zimmer Round-Rod Screens the solution to many of their problems. For sizing, dewatering and drying equipment, Bixby-Zimmer Screens offer:



### LONGER LIFE . . . . .

Stand up under maximum tonnage demands month after month . . . many now in service after more than two years steady production.



### MINIMUM MAINTENANCE . . . . .

Made of corrosion-resisting, stainless steel . . . designed to operate over long periods without down-time for screen changing or maintenance.



### LESS COAL LOSS . . . . .

Installed as original equipment by foremost coal preparation equipment manufacturers . . . have proven their ability to reduce waste.

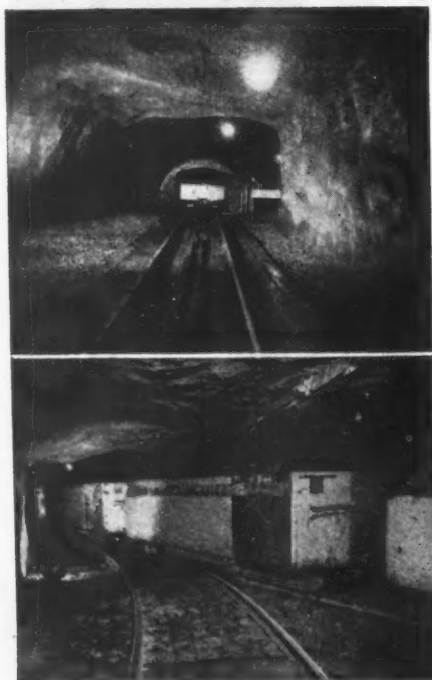
Let our staff of experienced engineers study your needs. They'll be glad to recommend screens to fit your plant and conditions. Phone, wire or write us TODAY.



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## CEMENT GUN COMPANY "GUNITE" CONTRACTORS GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



### MAINTENANCE COSTS ARE LESS

with "GUNITE" linings of roofs and sides of haulageways, slopes, entries and underground rooms.

"GUNITE" stops air slacking and eliminates most timbering. Roof fall hazards are minimized. The "GUNITE" surface is nearly white, resulting in much better visibility.

One inch of "GUNITE" is usually all that is needed but under particularly bad conditions it may be mesh reinforced and applied to a thickness of 2" or more.

The work can be done without hindering mining operations.

An application of "GUNITE" practically eliminates maintenance expense thereafter.

Write for our bulletin 2200, or better, let us drop in to discuss your problems with you.

**MANUFACTURERS OF THE 'CEMENT GUN'**

final report to the governors of the States involved and the Federal Power Commission for recommendations. Then the report will go to Congress for consideration by the House, as the Potomac Basin study was ordered by Congress.

In a memorandum brief submitted in opposition, Secretary Battle of the National Coal Association, said fulfillment of the project would displace upward of a million tons of coal annually and for all time. Furthermore, it said this would represent more than a million and a half dollars in miners' wages, plus more than half a million dollars in other operating costs at the mines, plus more than two million dollars in railroad freight revenue, besides another million dollars in other elements of cost attaching to the coal.

### Mine Officials Fined For Safety Violations

Six officials of the M. & S. Coal Co., near Minersville, Pa., charged with violating the mine safety code in connection with an explosion in 1943 which resulted in the deaths of 14 men were sentenced to pay fines ranging from \$100 to \$500 each. Officials of the company, who entered pleas of no contest to the suit, brought by the Commonwealth, said their investigation disclosed a broken light bulb near the scene of the explosion, which probably caused the accident.

### Susquehanna Co. Dines Personnel

Susquehanna Collieries Co. was host to supervisory personnel of its Glen Burn colliery and guests at a dinner March 14 in Shamokin, Pa. It was the last of a series of functions held by the company for its colliery supervisory forces signaling completion of the conferences on job relations held during the year.

### Mine A Suspends; Seam 'Exhausted'

Work at Mine A, west of Springfield, Ill., was suspended March 27 and Carl Elshoff, president of the Mine B Coal Co., operator of the mine, said it was being abandoned, "the coal seam having been exhausted." The shaft at Mine A was sunk in 1892 and the mine has been a producer since that time. It has been under the operation of the Mine B Coal Co. for the last 20 years. Prior to its closing the mine employed 300 men, who were members of the United Mine Workers Union of America. Mine B, which also was operated by the company, was abandoned 16 months ago for the same reason, Mr. Elshoff said.

John Bantzye, head of the Citizens Coal

## WHEN— You Require:

Fans  
Blowers  
Pumps  
Compressors  
Conveyors  
Machine Tools  
Line Shafting  
Loaders

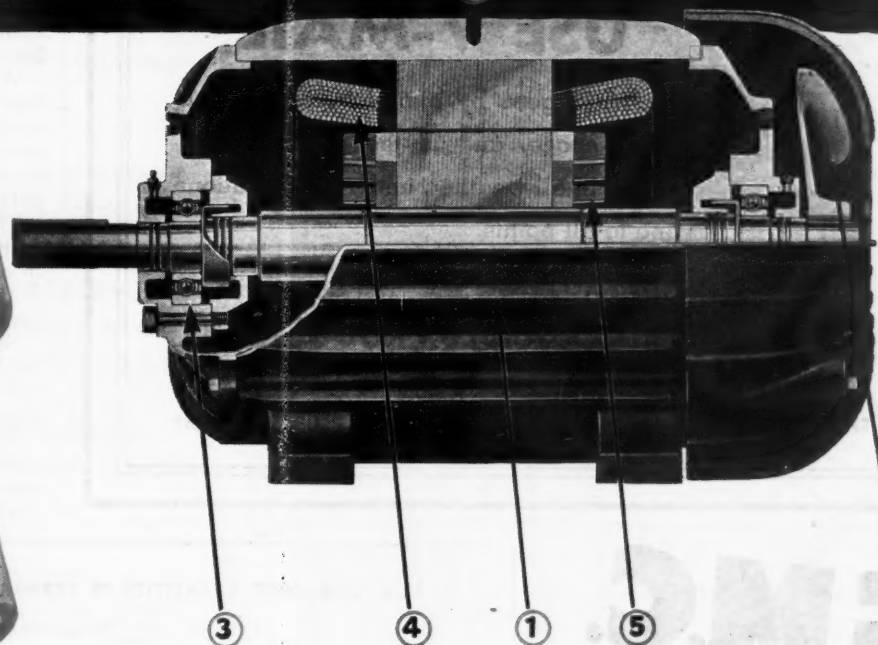
## WHERE— There Is:

Dripping or  
Splashing Liquids  
Acid or Alkali Fumes  
Air-borne Moisture  
Steam  
Coal Dust and Dirt  
Metallic Chips

## WHY— Because:

Low First Cost  
Minimized  
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Replacement Parts

# SEALEDPOWER motors



The **SEALEDPOWER** a-c motor is right for all general purpose applications in the modern coal mine. The panels show when it should be specified . . . where it fits into modern mining . . . why it should be used.

An exclusive Crocker-Wheeler design, the **SEALEDPOWER** motor has a totally enclosed frame, (1) in illustration, that seals out coal dust and other foreign matter which would cause premature breakdown of insulation in a less well-protected motor. The motor is cooled by a large fan (2) which is safely enclosed in a cowl. This fan blows air over the frame, not through easily-clogged, hard-to-clean passages as is the case in conventional fan-cooled types.

Other design features include patented *Groovseal*

bearings (3) which require regreasing only once a year, or even less frequently. Vacuum impregnated windings (4) reduce hot-spot temperatures and lengthen insulation life. The dynamically balanced *Alucast* rotor (5) is practically indestructible.

Why not ask the Crocker-Wheeler field engineer nearest you for complete details of this unique motor? Crocker-Wheeler builds a complete line of general purpose a-c and d-c motors for coal mine service . . . a-c from 1 to 10,000 horsepower, 208 to 2400 volts (or higher), 60 and 50 cycle, 3 and 2 phase . . . d-c from 1 to 5,000 horsepower, 115 to 550 volts. For prompt service and unbiased advice on the best motor for every application write or call the field engineering office nearest you.



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A DIVISION OF JOSHUA HENDY IRON WORKS, AMPERE, NEW JERSEY

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FLEXIBLE COUPLINGS



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Write today . . . and write often.  
Give him a lift with a cheerful note.

### USE V-MAIL

It always goes by plane, saves precious  
cargo space, and is the safest, surest,  
fastest in all weather, under all conditions  
and to all points.

#### THE AMERICAN CRUCIBLE PRODUCTS CO.

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Lorain, Ohio, U. S. A.

SPECIALIZING IN BRONZE BEARINGS AND BUSHINGS FOR MINING EQUIPMENT

Mining Co., Peoria, Ill., which owns Mine A and Mine B, stated, however, that operations in neither mine will be given up entirely, despite the fact that Mr. Elshoff has given up leases on the mines. The Citizens company holds 1,000 acres of coal rights in the Springfield area and plans continued operation of Mine A and Mine B.

### Coal-Mine Fatality Rate Eases Still Lower

Accidents at coal mines of the United States caused the deaths of 57 bituminous and 6 anthracite miners in February last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 46,900,000 net tons, the accident death rate among bituminous miners in February last was 1.22 per million tons, compared with 1.51 in the preceding month and 1.44 in February, 1944.

The anthracite fatality rate from accidents in February last was 1.36, based on an output of 4,418,000 tons, against 2.36 in the preceding month and 5.74 in the second month a year earlier.

For the two industries combined, the accident fatality rate in February last was 1.23, compared with 1.58 in the preceding month and 1.67 in February, 1944.

Fatalities during February last, by causes and States, as well as comparable rates for the first two months of 1944 and 1945, were as follows:

#### U. S. COAL-MINE FATALITIES IN FEBRUARY, BY CAUSES AND STATES

State	Underground						Shaft	Open-Cut	Surface	Grand Total
	Falls of Roof	Haulage	Gas or Dust Explosions	Explosives	Machinery	Total Underground				
Alabama	2	2	..	..	..	4	..	..	..	4
Colorado	1	1	..	..	..	2	..	..	..	2
Illinois	1	..	..	..	1	2	..	..	1	3
Indiana	..	..	..	1	..	1	..	..	..	1
Kentucky	3	3	..	..	..	6	..	..	..	6
New Mexico	..	1	..	..	..	1	..	1	1	2
North Dakota	..	..	..	..	..	..	1	1	..	1
Ohio	..	1	..	..	..	1	..	..	..	1
Penna. (bit.)	4	1	2	..	..	7	..	..	1	8
Tennessee	1	..	..	..	..	1	..	..	..	1
Utah	2	1	..	..	..	3	..	..	..	3
Virginia	1	..	..	..	..	1	..	..	..	1
West Virginia	12	5	..	2	1	20	..	..	..	20
Wyoming	2	..	..	..	1	3	..	..	..	3
Total bituminous	29	15	2	3	3	52	1	1	3	57
Penna. (anth.)	4	2	..	..	..	6	..	..	..	6
Grand Total	33	17	2	3	3	58	1	1	3	63

#### DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS\* January-February, 1944 and 1945

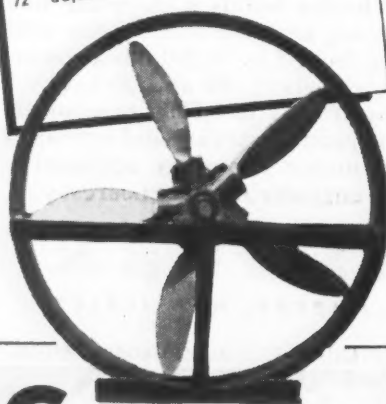
Cause	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
Underground:	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945
Falls of roof and coal	98	64	0.918	0.646	19	13	1.742	1.510	117	77	0.994	0.715
Haulage	38	35	.356	.354	4	2	.367	.232	42	37	.357	.344
Gas or dust explosions:												
Local	..	5	..	.050	1	..	.092	..	1	5	.009	.046
Major	..	9	..	.091	..	..	..	..	..	9	..	.084
Explosives	1	5	.010	.050	5	1	.458	.116	6	6	.051	.056
Electricity	4	1	.037	.010	..	..	..	..	4	1	.034	.009
Machinery	8	10	.075	.101	..	..	..	..	8	10	.068	.093
Shaft	3	1	.028	.010	..	..	..	..	3	1	.025	.009
Miscellaneous	4	..	.037	..	2	..	.183	..	6	..	.051	..
Stripping or open-cut	3	4	.028	.040	1	..	.092	..	4	4	.034	.037
Surface	9	8	.084	.081	4	3	.367	.348	13	11	.110	.102
Total	168	142	1.573	1.433	36	19	3.301	2.206	204	161	1.733	1.495

\* All figures subject to revision.

# G.M.C.

## Venta-mine FANS

Made in 4 sizes, 36", 48", 60" and 72".  
All have cast aluminum blades—60" and  
72" adjustable pitch. Write for details.



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# MECHANIZED MUCKING

## A New Method in Vertical Shaft Sinking

**Longyear Engineers** have perfected a new process which converts mucking from slow hand labor to mechanized handling by means of a clamshell and hoists. Employed in a number of our shaft contracts, mechanized mucking has demonstrated faster progress and lower costs.

**THIS PATENTED METHOD OF SHAFT MUCKING WILL HANDLE HARD OR SOFT—BLOCKY OR FINE—WET OR DRY—MUCK. AND THE RATE OF EXCAVATING—PER HOUR—IS LARGELY DEPENDENT UPON THE CAPACITY OF THE MAIN SHAFT HOIST.**

**LET US EXPLAIN THE ADVANTAGE OF MECHANIZED SHAFT MUCKING TO YOU**

### Parts Reference

**A**—Clam Operator • **B**—Carriage Operator • **C**—Carriage—Moves Horizontally • **D**—Combined (Carriage, Framing and Blasting) Stage—Detachable—Lowered Set by Set.

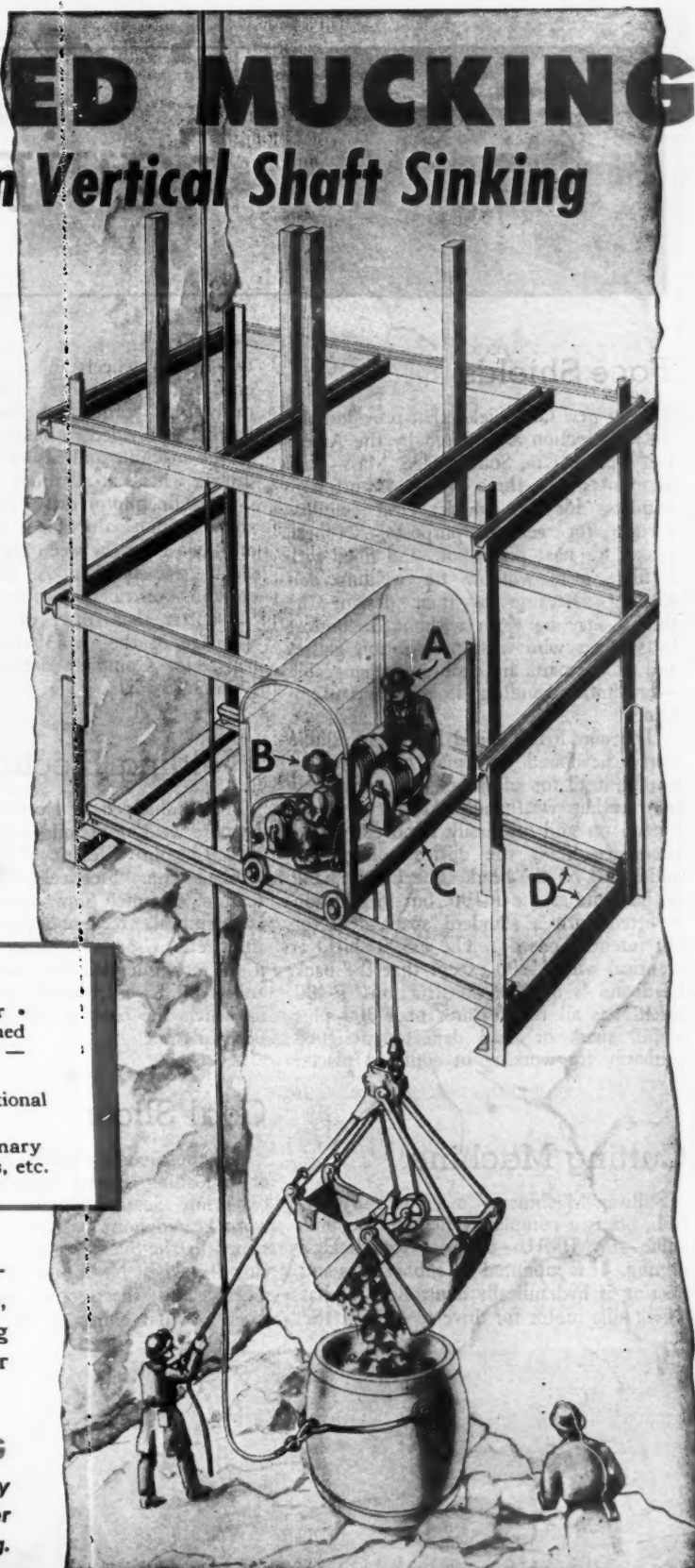
Hoisting Compartments Equipped with Conventional Safety Crosshead, Stops, etc.

Ladder Compartment Equipped with Customary Ladder, Pipe Lines, Electric Cables, Signal Lines, etc.

**Contract Shaft Sinking**—Our engineering services are available for sinking new shafts or slopes, deepening old shafts, tunnelling, drifting, cutting stations and ore pockets. Consult with us on your shaft work.

### LICENSE TO USE MECHANIZED MUCKING

If you decide to do your own shaft sinking, you may license the use of **MECHANIZED MUCKING** under U. S. Patent No. 2,326,172. Foreign Patents Pending.



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**MINING ENGINEERS AND CONTRACTORS**

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**DIAMOND CORE DRILLS • CONTRACT CORE DRILLING AND SHAFT SINKING • GEOLOGICAL INVESTIGATIONS**





# Equipment News

## Face Shields

Four new face shields that provide light-duty protection are offered by the American Optical Co., Southbridge, Mass. Also announced are three types of button-on windows for the shields: clear cellulose acetate for general purposes; 24-mesh screen for heat protection, and fiber with a filter glass window for welding and scarfing. Because of their design, the shields may be worn without discomfort by workers who wear prescription glasses and all the parts are easily interchangeable—facilitating handling, stocking and assembling.

The new F-100 shield has an adjustable elastic headband that may be worn low on the head for additional comfort. Genuine leather sweatbands, like the windows, button on and are easily removed. Fiber headpiece holds the device comfortably and firmly on the head. The F-200 shield is the same as the F-100, but in addition is fitted with a standard spark deflector (or forehead guard). The F-300 shield is identical with F-200 except that the back headband is of fiber construction. F-400 shield has all the features of F-300 plus a full spark or head deflector designed primarily for working in confined places.

## Cutting Machine

Sullivan Machinery Co., Michigan City, Ind., offers a completely new cutting machine—the 10-RU—designed for trackless mining. It is mounted on rubber tires and steering is hydraulically controlled. It has a hydraulic motor for drive to each of the

two driving wheels and a short wheelbase enabling it to maneuver in a small area and easily turn corners. A floating rear axle has been provided to maintain equilibrium of the machine and insure traction of the driving wheels at all times.

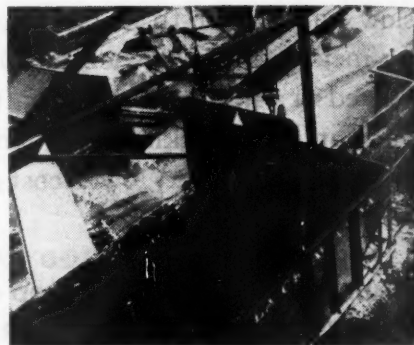
A 50-hp. motor drives the cutter chain and only one reduction is made, requiring only two gears, between motor and cutter-chain drive sprocket. An overload friction clutch is provided to prevent damage to the cutter chain drive in case of sudden stoppage of the cutter chain by sulphur balls, etc. Complete details are given in Bulletin C-33.

## Welding Electrode

A new shielded arc electrode for general-purpose welding of mild steel is offered by the Lincoln Electric Co., Cleveland. Designated as "Fleetweld 47," it is said to feature extremely low spatter loss, easy slag removal, excellent restriking characteristics, etc. Used with either a. c. or d. c., it is recommended for high-speed horizontal or flat fillet welds over 4 in. long in which the coating can be dragged on both plates.

## Coal Slicer

For those confronted with the problem of unloading frozen bituminous coal a two-drum electro-hydraulic friction-clutch worm-gear hoist has been especially designed by the Silent Hoist Winch & Crane Co., Brooklyn, N. Y., for operating a coal slicer. This slicer raises and lowers a slicer bar that chops up the coal so that

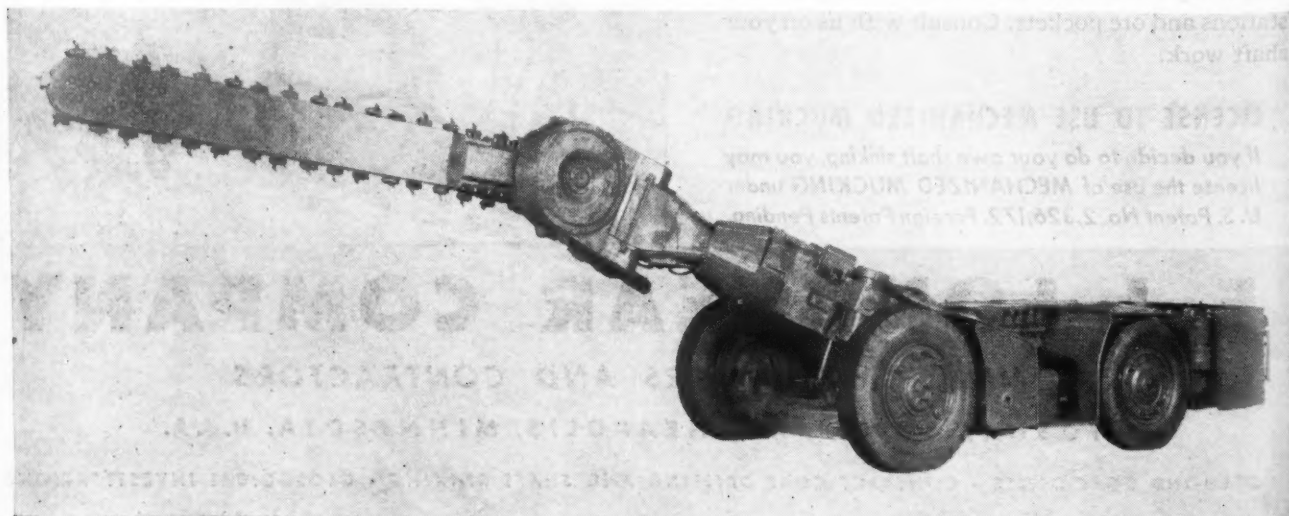


it will freely flow through hopper-car doors. In combination with the hoist, the slicer bar also helps to move the coal from the various pockets of the car to the doors.

The Coal Slicer hoist (Model TWWX) is mounted on the existing overhead bridge crane that may be in service and is operated from the crane cab—with finger-tip control, it is said that an operator can slice coal all day long without fatigue; capacity, 6,000 lb. at 105 ft. per minute.

## Band Backstops

A shoe acting directly on the brake drum is one of the unusual features on a new, improved differential band-type backstop offered by Barber-Greene Co., Aurora, Ill. The new backstop, available in 12-, 18- and 24-in.-diameter drum sizes, is said to be simple and trouble-free. Instead of the brake band taking all the torque required to hold the conveyer, the shoe takes an appreciable part of the load. When the differential acts and the band tightens,



J&L PERMASET

PRECISIONBILT, PRE-FORMED WIRE ROPE

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

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Built with Precision to serve  
you with profit. Like a transit,  
J&L Wire Rope is precisionbilt. It is  
built from J&L Controlled Quality Steel  
... by men of skill and experience ...  
on machines of the latest design. This  
combination naturally produces for you  
wire rope that works better, lasts longer,  
returns you greater profit on your in-  
vestment in equipment.

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STEEL**

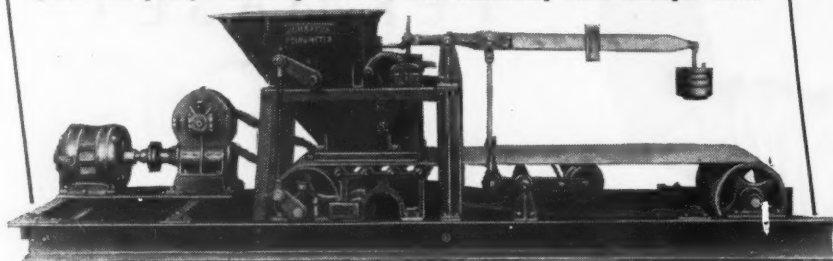
J&L PERMASET

PRECISIONBILT PRE-FORMED WIRE ROPE



## Set it... Forget it!

That's one of the advantages of the SCHAFFER Poidometer . . . it can be set to deliver coal in the size, weight and blend your market requires . . . and then forgotten, for it will do all this automatically! Poidometers can be used singly or in batteries. Automatic electric controls stop one or a dozen machines when an insufficient quantity of any one material is delivered, and start them upon receipt. By the use of a battery practically any preparation requirement can be met economically and efficiently. Poidometer units can be supplied with pulley centers up to 35'0", thus eliminating extra conveyor costs.



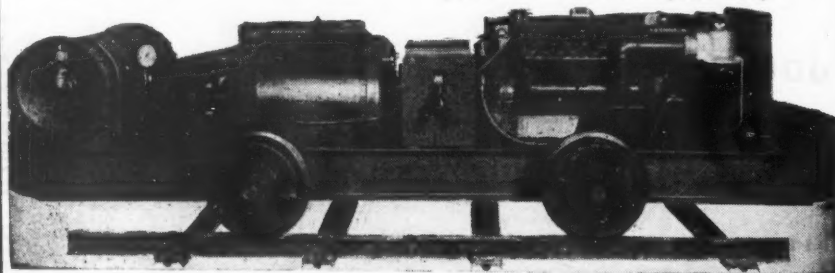
Write for your copy of our Catalog #8. It describes in detail the advantages and operation of the Poidometer.

**SCHAFFER POIDOMETER CO.**  
2828 Smallman St. Pittsburgh 22, Pa.



Light Weight  
Low Height

Compact  
Mobile



**ACME COMPRESSOR CO.**  
Williamson, West Virginia

This mobile unit only 127 inches long—weighing only 3510 pounds—each and provided with coupling for towing—delivers 92 cu. ft. of air per minute at 100 lbs. pressure.

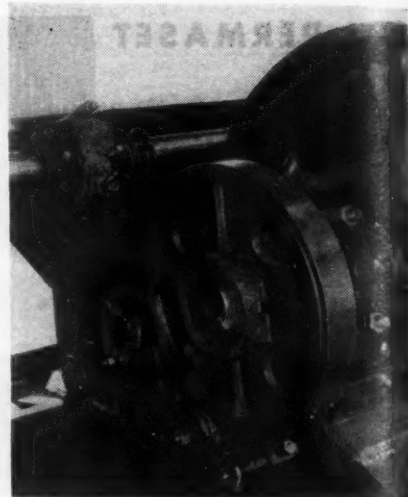
Designed especially for mine use it is adaptable to both high and low seam operations only 27½" high—particularly mechanized mining.

The car is equipped with one floating and two stub axles eliminating danger of derailment. Furnished in track gauges from 36" to 56".

The "Lowboy" Model 110 shown offers the latest in mine car compressors—sturdily built—efficient—economical to operate.

### WRITE FOR BULLETIN 3920

This bulletin shows how well the "Lowboy" is built—details of construction—illustrates sturdy frame design and gives complete specifications. Write for yours today.



the shoe is pulled up against the drum with great force, giving added friction (18 to 20 percent additional drum circumference is brought into contact through use of the shoe).

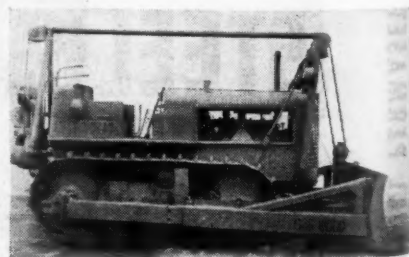
Internal stress set up in the band and shoe on the brake drum on the backward rotation of the drive shaft exerts a squeezing motion, causing a breaking action by internal forces only. Ordinarily, the braking forces must be taken through, and resisted by, the point of anchorage to the conveyor frame, which requires an extremely heavy structural support. In this new design these forces are resisted internally and the only force going through the conveyor frame is that required to prevent a rotation of the brake.

## Fire-Resistant Paint

A new Underwriters' approved paint that protects wood and other materials against fire hazard is offered by the General Detroit Corp., 2270 East Jefferson Ave., Detroit 7, Mich., and the General Pacific Corp., 1800 South Hooper St., Los Angeles 21, Calif. Called Fi-Repel, it is made for protection of all interior combustible surfaces. Shipped as a concentrated paste, after dilution it can be applied with a brush or spray gun to the surface to be protected. One concentrated gallon, at standard dilution, will cover as much as 185 sq.ft. with two coats. Standard color is bone white, but tints may be added.

## Bulldozer

Gar Wood Industries, Detroit, Mich., offers the new cable Dozecaster in limited quantities for essential civilian use. Of the angling blade type, this new dozer



is designed to place the moldboard close to the radiator for better balance and easier pushing.

Tilting of the moldboard is achieved by using a double trunnion on the main frame, eliminating the necessity of installing a tilting mechanism on the moldboard itself. The sheaves are of steel, hardened in the rope grooves and mounted on hardened and ground shafts with roller bearings. For operating the unit the maker offers the cable control in both single and double drum type. The Dozecaster is mounted on an Allis-Chalmers HD14 diesel tractor.

## Flashlight Battery

Forty percent greater capacity and higher sustained bright light is claimed for a new improved model rechargeable flashlight battery offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. This battery, it is said, may be charged from any a. c. electrical outlet by means of a rectifier type charger or from the d. c. ignition system of automobile, truck or bus.

## Safety Splice

American Chain & Cable Co., Inc., Bridgeport, Conn., has developed a new method for splicing wire rope into slings or various assemblies which is said to render hand-tuck splicing obsolete and unnecessary. The Acco-Loc safety splice is stated not to distort the rope structure and so maintain equalization of stresses in all strands.



The splice applies the load stress in direct line with the pull of the load. It may be used with any standard fitting (hook, ring, shackle, thimble, etc.), and when the sling or assembly is retired, such fittings may be salvaged and reused. At present this new safety splice can be applied only at the factory.

## Air-Fed Helmet

To give welders complete relief from obnoxious fumes, a new air-fed welding helmet designed by a group of doctors and safety engineers is offered by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 11, Ill. Originated by the Pullman Standard Mfg. Co., with the aid of the Northwestern University Medical School, it is identified by the name Cesco "Air-Flow" welding helmet.

Clean, fresh air is said to be scientifically fed into the helmet through a supply tube encircling the lens holder, flowing gently

# LOWER Screen Costs

## FOR COAL MINES

If you would like to reduce your screen costs and increase screening efficiency—let us show you what Wedge Wire Screens can do for you. With Wedge Wire Screens, clogging is practically eliminated because of wedge shape of cross strands and the downward enlarging openings. Wedge Wire is the answer to low cost, long life, free-of-excess-maintenance screening operations. Write us today. Find out how Wedge Wire Screens can save you money.

- ★ Quick and easy clearance . . . faster, cleaner screening.
- ★ Precision-built for long life.
- ★ Screen openings 1/4 to 2 m.m.
- ★ Stainless steel construction . . . less maintenance.

LONG LIFE, NON-CLOGGING PROCESSING SCREENS

# WEDGE WIRE CORPORATION

5602 Clark Ave., Cleveland 2, Ohio

## CLEAN COAL IS AN ASSET

# Dustproof your coal with WYANDOTTE CALCIUM CHLORIDE

- Coal that's free from dust and dirt—easy to handle—naturally wins friends among dealers and consumers alike. They'll remember you in the future if you dustproof your coal now with Wyandotte Calcium Chloride.

- Treatment of coal with Wyandotte Calcium Chloride is safe, economical and easy. A little does a lot to dustproof your coal and give it a sheen that will catch the consumer's eye.

- Investigate today the many advantages of this process. Mail the coupon for full information and literature about Wyandotte Calcium Chloride.

WYANDOTTE CHEMICALS CORPORATION  
Michigan Alkali Division  
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

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Address

Title



# Wyandotte

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## CALCIUM CHLORIDE

WYANDOTTE CHEMICALS CORPORATION  
MICHIGAN ALKALI DIVISION  
WYANDOTTE, MICHIGAN





# GIBALTAR

## oil concentrate


*Preserves vital engine parts*

Gibraltar Oil Concentrate readily meets the need for proper lubrication of combustion engines. When properly blended with any good motor oil, Gibraltar Oil Concentrate assures superior lubrication and reduces friction, saving excess wear on vital engine parts and eliminating the necessity of frequent overhauls.

The concentrate is made from a straight mineral oil base, processed under a secret formula enabling it to withstand high temperatures. It prevents the formation of hard carbon, safely increases the speed and life of the motor and reduces maintenance. Complete details on request.

#### RECOMMENDED FOR USE IN

Diesel Engines  
Air Compressors  
Vacuum Pumps  
Steam Engines  
Gas Engines  
Aviation Oils  
Automobile and  
Truck Engines



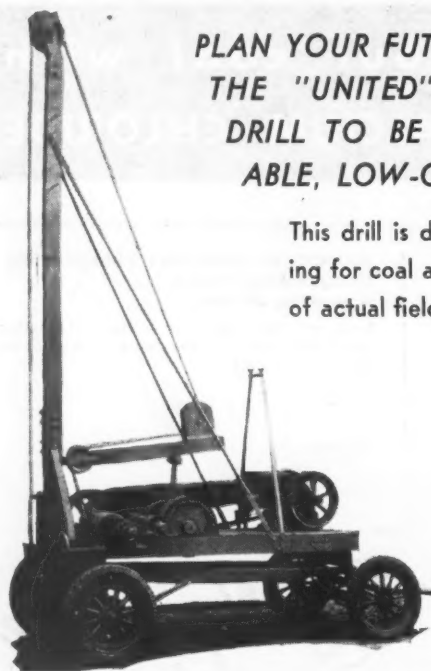
### HOOD REFINING CO.

152 N. HAMILTON AVENUE  
GREENSBURG, PA.

## "UNITED" PROSPECT DRILL

PLAN YOUR FUTURE OPERATIONS WITH  
THE "UNITED" PORTABLE PROSPECT  
DRILL TO BE ASSURED OF DEPEND-  
ABLE, LOW-COST RESULTS.

This drill is designed especially for prospect-  
ing for coal and the design is backed by years  
of actual field experience.



#### Manufacturers of

- 6 to 50 ton trailers
- coal pinning machines
- coal crushers
- pick breakers
- vibratory screens
- conveyors
- feeders
- loading booms
- shaking screens

Information in detail on request

### UNITED IRON WORKS COMPANY

ENGINEERS • FOUNDERS • MANUFACTURERS  
PITTSBURG KANSAS



along the shell and traveling to every outer edge. The directional flow of the fresh air, it is said, prevents stale or fume-laden air from entering; heat is cut down.

### Water-Service Packing

To meet the need for a general utility lubricated centrifugal pump packing, Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, N. Y., has developed Palmetto plaited packing. Long-fiber asbestos yarn is used instead of cotton, with the advantage, it is said, that the packing can be used for hot water as well as cold water. The lubricant is Palmetto graphite grease, which protects the packing from waterlogging and disintegration. Plaited in square form, and made in a wide range of sizes, this packing is recommended for centrifugal-pump shafts, reciprocating pump rods and plungers, valves, fire hydrants and other apparatus handling hot or cold water.

### Idler Sheaves

Lake Shore Engineering Co., Iron Mountain, Mich., offers plate steel and plate aluminum rubber-lined idler sheaves for application in the mining industry as replacements for the old-style cast-iron idler sheave. As compared with their predecessor they are said to have greatly decreased weight and cause less friction.

Standardized with a 20-in. diameter and 3-in. bore, Lake Shore sheaves permit interchangeability of sheaves, liners, plates and roller bearings. The roller bearings are said to reduce friction, require less lubrication, reduce maintenance and minimize or eliminate bearing and shaft replacements.

### 2-Piece Dipper Tooth

A new two-piece dipper tooth developed by the Daniels-Murtaugh Co., Cedar Rapids, Iowa, is designed for use on a wide range of digging and loading equipment, such as dippers, clamshell and dragline buckets and trencher buckets. The two parts of the "Wear-Sharp-Tooth" (patent pending) are designated as the

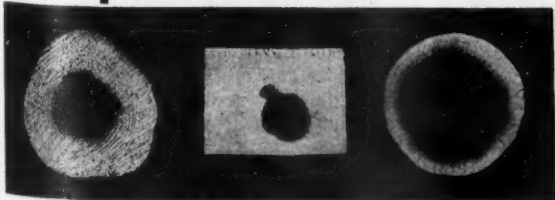
# OSMOSE-TREATED TIES AND TIMBERS

## *... Now Available*

**F**OR those companies who prefer to purchase treated timbers, facilities are now available for the treating of ties and timbers with OSMOSALTS... the clean, paintable, fire-retardant wood preservative.

Regardless of whether you desire to supply your own timbers for Osmosalts preservative treatment or prefer Osmosalts treated timbers, ready to use, there are plants strategically located in the following states to serve you: WEST VIRGINIA, ALABAMA, KENTUCKY, COLORADO, SOUTH DAKOTA.

Remember this important point. The Osmose method of wood preserving has been thoroughly proven in many strictly conducted and authoritative tests. It has been widely used for years in many industries. We will be glad to furnish you with full substantiating data and prices. If you prefer to treat your own timber on your own property, we can furnish Osmosalts together with useful information on the most economical methods. Write us today.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

## OSMOSALTS

*Nature's Method of Wood Preservation*

Composition and Process Patented and Patents Pending

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.;  
BECKLEY, W. VA.; HARLAN, KY.



# ACKER TEST CORE DRILLS

For proving coal deposits preliminary to strip mining, ACKER CORE DRILLS are simple to operate. Hand feed pressure permits taking advantage instantly of softer strata to increase progress and lower costs.

Many Applications. No Special Skill Required.  
Combine Prospecting and Blast Hole Drilling.

Complete Line of:

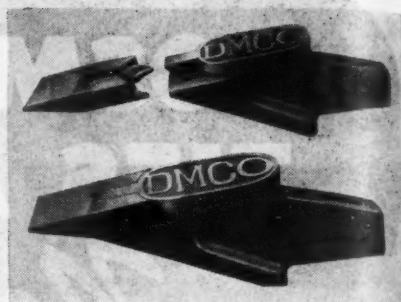
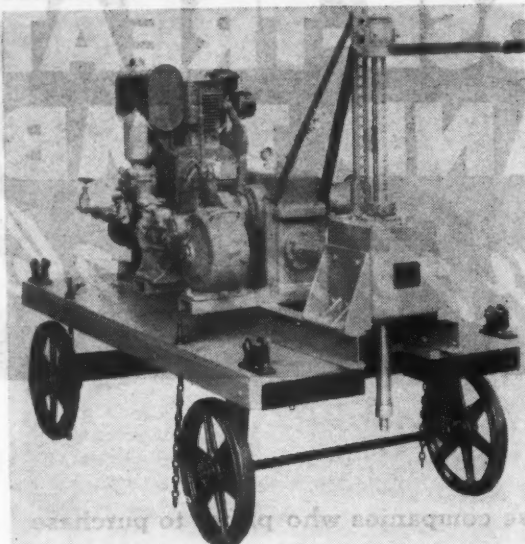
Earth Augers—Soil Samplers—Tools and Equipment for Mineral Prospecting and all subsurface explorations.

SEND FOR LITERATURE TODAY ABOUT QUICKER-  
LOWER COST CORE DRILLS. TIMKEN EQUIPPED.

## ACKER DRILL CO.

725 W. LACKAWANNA AVE

SCRANTON 3, PA.



penetrator point and the "Weldapter." The point is double-keyed to the Weldapter and tack-welded. The double-key supports, one lengthwise and one crosswise of both parts, are said to take all the digging stresses upward and downward as well as side thrusts and impact shocks.

## Blow Guns

Since air and water hose in industrial plants and other places are very often used with spray guns, nozzles and hand-operated valves, the B. F. Goodrich Co., Akron, Ohio, is adding to its line of industrial hose a complete series of Lonn blow guns, whose finger-tip control is said to be made possible by use of rubber.

Made by the Lonn Mfg. Co., Indianapolis, Ind., these blow guns, known as air savers and water savers, are offered in several styles with various degrees of flow or restricted flow. The Lonn valve features an internal trigger principle and involves only three principal working parts.

## Cable Connector

O. Z. Electrical Mfg. Co., Brooklyn, N. Y., has brought out a newly designed combination two-way connector that can accommodate several sizes of wire. High



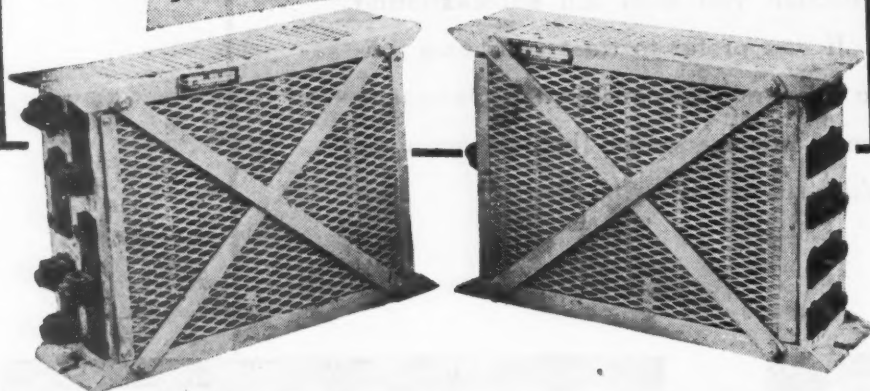
clamping pressure is exerted by the plates, held in place by socket-head capscrews. It also can be used as a reducing connector within the wire limitations of each size fitting.

## Dust Collector

A unit type dust collector said to be powerful yet inexpensive is offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. It readily fits behind or beside machines as they stand. Dust-laden air is drawn through the inlet pipe into twin cyclone separators, the lighter air passing on through a viscous coated filter, where very fine dust is removed. Clean air is discharged back into the room. The filter consists of 20 layers of viscous filter paper. To restore the filter's efficiency after it becomes dirty it is necessary only to peel off the first two layers.

# G.M.C. RESISTANCES

for MINE LOCOMOTIVES



G.M.C. Resistances are built in any size required. Their design incorporates helical coils of alloy wire, supported by an external frame, this completely protecting the units from injury. Coils are highly resistant to the action of mine water and mill fumes; and vibration does not affect them. Insulators are of a type not harmed by sudden changes of temperature. Construction includes a shield to protect coils from outside injury and foreign objects which might cause "shorts".

Full information on G.M.C. Resistances will be sent immediately on request.  
Write today!

## GUYAN MACHINERY COMPANY

Logan . . . . . West Virginia

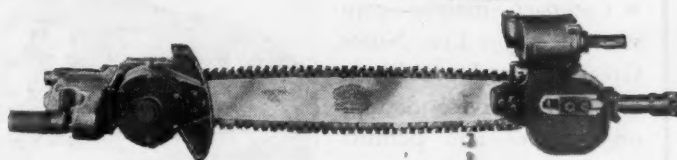
# CUTS THROUGH TIMBERS AT A SPEED OF AN INCH A SECOND!



## DISSTON CHAIN SAWS



DISSTON CHAIN SAW with Mercury Gasoline Engine



DISSTON CHAIN SAW—Pneumatic

Mine operators, in increasing numbers, are helping to overcome the handicap of manpower shortage through the use of this time-and-cost-cutting saw. In numerous cases it has been shown that as much work can be done in an hour or two with a Disston Chain Saw as can be done in a day with a cross-cut saw.

Disston Chain Saws are used in and about the mine for cutting props, beams and ties; timbers for shafts and tipples; and other construction work. And wherever Disston Chain Saws are used they are performing with efficiency and economy—often paying for themselves in a short time from savings in labor costs alone.

Being made of the finest materials and with

characteristic Disston thoroughness, the saws will stand up in service. They are light in weight, easy to handle, and require no previous experience. Supplied in two types: with Mercury Gasoline Engine, and with pneumatic drive. Either can be operated for both horizontal and vertical cutting.

Disston Chain Saws are *available now*. Write for full particulars.

**HENRY DISSTON & SONS, INC., 542 Tacony, Philadelphia 35, Pa., U. S. A.**





## Stop Those Leaks With SIKa

### If This Is Your Problem:

- to seal leaks, in mine buildings, shafts and other concrete structures, from the inside against pressure.
- to prevent future seepage.

### Here Is Your Solution:

- hack or sandblast entire surface and clean thoroughly.
- divert water to enlarged bleeder holes by applying quick-setting mortar to smaller leaks. For trowelling use SIKa No. 4A; for guniting, use Gunite SIKa.
- plug bleeders with extremely fast-setting SIKa No. 2 mortar.
- apply a protective cement coat over entire surface to prevent future leakage. As a water-resisting compound, use SIKa No. 1 for trowel application, or Gunite SIKa for Gunite work.

Waiting for you — a copy of SIKa's condensed catalog, with quick, concise information on these SIKa compounds. Write for your copy today.



## SIKA CHEMICAL CORPORATION

45 Gregory Avenue

Passaic, N. J.

*Manufacturers of*

Compounds for Concrete Problems • Plastiment, The Concrete Densifier



- Compact—mobile—convenient — the Lee - Norse Greasing Truck provides a complete "service Station on wheels" and permits regularly scheduled greasing of all mining equipment at the face.

This modern truck has a six - barrel capacity with three or more standard lubricants:

- Hydraulic Oil
- Transmission Lubricant
- High Pressure Chassis Lubricant

For greater efficiency in your mine, use Special Equipment by Lee-Norse.

We also completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders.

Phone us—Charleroi 750

**Lee-Norse Company**  
CHARLEROI, PA.

## Industrial Notes

WESTINGHOUSE ELECTRIC CORP. is to be the new name of the Westinghouse Electric & Mfg. Co.

LAPLANT-CHOATE MFG. CO., INC., Cedar Rapids, Iowa, has appointed as vice president and general sales manager S. L. ("Sid") Myers, formerly vice president in charge of export sales. He succeeds H. H. Buchanan, resigned. Starting as a helper in the machine shop, Mr. Myers has been with the company 22 years.

A. LESCHEN & SONS ROPE CO., St. Louis, has appointed Douglas W. Vernon as general manager of sales.

ATLAS POWDER CO., Wilmington, Del., has appointed Guy F. Rolland as director of its Reynolds experimental laboratory, near Tamaqua, Pa. He has been with the company since 1927. James H. Buchanan, who has represented the company in Chicago since 1938, has been named manager of the newly created Chicago district sales office, in the Field Building, 135 South LaSalle St. The new district will include the States of Illinois, Wisconsin, Minnesota and most of Indiana.

CATERPILLAR TRACTOR CO., Peoria, Ill., has advanced eight men in its parts department: M. T. Deames, with the company since 1929, when he started as a stock man and order filler, later becoming domestic and export order clerk, chief clerk and supervisor, has been named assistant general parts manager. Assisting him as parts managers will be A. H. Yingst, for export and governmental sales; T. H. Hodgins, for the central sales divisions; C. M. McKnight, for the western, and B. W. Kramm, for the eastern sales division. Other appointments include E. L. Mason, H. F. Haven and C. D. Byrns to the positions of assistant parts managers of the central, western and eastern sales divisions respectively.

AMERICAN CAR & FOUNDRY CO. has appointed Frederick H. Norton as assistant vice president in the sales department, with headquarters in New York City.

OLIN INDUSTRIES, INC., and subsidiaries has appointed F. S. Elfred Jr. as general manager of its explosives division (subsidiaries include Western Powder Mfg. Co., Peoria, Ill., and Liberty Powder Co., Pittsburgh). He also will be general manager of the Equitable Powder Mfg. Co., East Alton, Ill., and its affiliates, the Columbia Powder Co., Tacoma, Wash.; Egyptian Powder Co., Pollard, Ill., and Texas Powder Co., Dallas, Texas.

DUFF-NORTON MFG. CO., Pittsburgh, Pa., has elected as president Walter I. Floyd, formerly executive vice president. He succeeds Robert G. Allen, resigned. W. T. Edwards succeeds P. G. Kimball as district manager for the coal-mining areas of Pennsylvania, West Virginia, Kentucky, Alabama, Ohio, Indiana and Illinois, with headquarters in California, Pa.

UNITED STATES VANADIUM CORP., a unit of Union Carbide & Carbon Corp., has formed a new Metal Chemicals Division, which will manufacture and market

# A NEW STANDARD FOR HEAVY-DUTY TRUCKS

The Army called for the roughest, toughest truck that could be built, designed to begin its job where most other trucks stop.

Ward LaFrance has been producing this super truck in volume for Army ordnance. Out of it has come an entirely new standard of heavy-duty truck reliability and performance. Ward LaFrance has been building

good trucks for a quarter of a century, but frankly, never any that could compare with these new commercial models inspired by the design and performance of the Army M1A1 Heavy Wrecker. They are big trucks with pay load capacity ranging up to thirty tons. They are built to take a beating and still stay on the job. They are designed, engineered, and manufactured to establish new standards in low-cost hauling. Before you invest, investigate Ward LaFrance.

## FRANCHISES ARE AVAILABLE

to aggressive dealers in a number of attractive territories. Leading dealers now handling smaller, non-competitive trucks will be especially interested in the Ward LaFrance dealer plan.

# WARD LAFRANCE

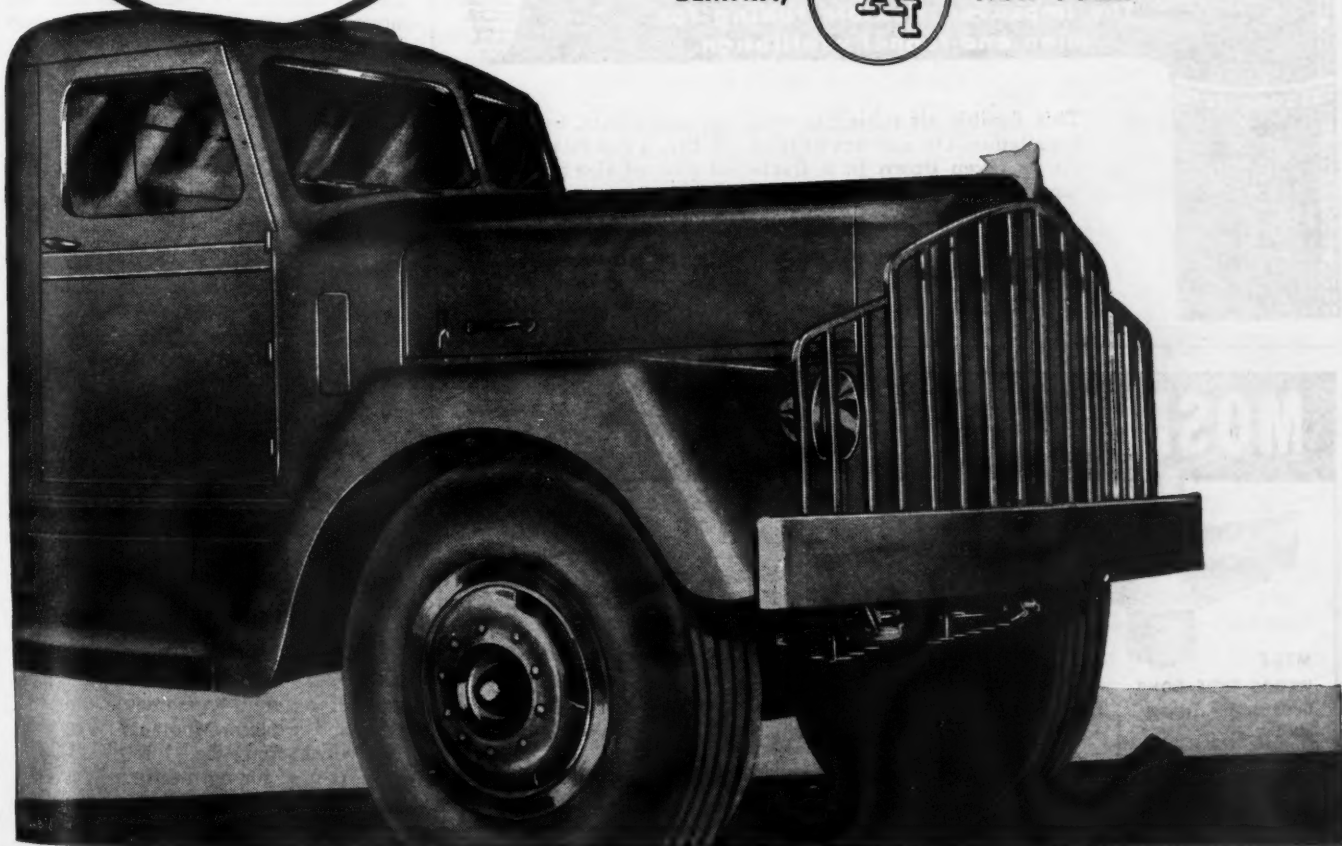
## TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA,



NEW YORK

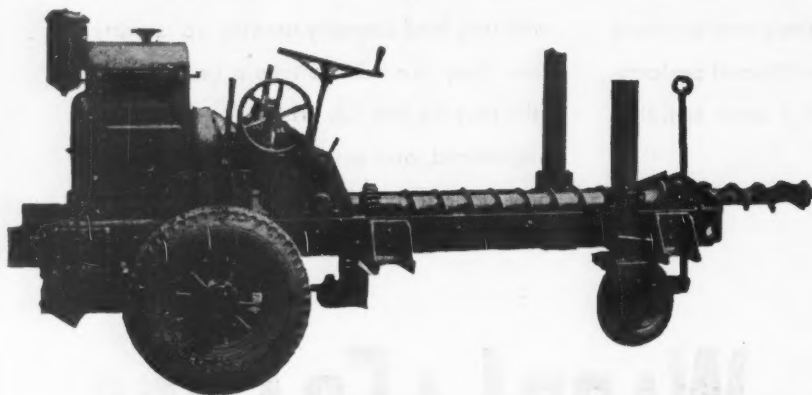




# PARMANCO Horizontal Drills

## "Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling — All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators — Write us your drilling problems.



**PARIS MANUFACTURING CO.**  
PARIS, ILLINOIS

## FLEXIPIPE

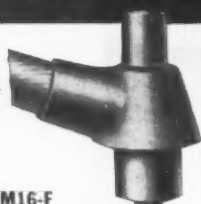
The improved flexible tubing for  
mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

*Write for free sample and full information.*

**BEMIS BRO. BAG CO.**  
412 Poplar Street, St. Louis 2, Mo.

## MOSEBACH HEADQUARTERS FOR MESCOWELD RAILBONDS



**M16-F**  
**WEDGE TYPE BOND**  
Designed for Temporary Use.



**M5-F**  
**DUCKBILL TYPE BOND**  
For Use on Top of Base  
of Any Size Rail.



**M8-F**  
**SEPARATE JOINT BOND**  
Designed to Permit  
Straight Line Welding.

There is a Mosebach Rail Bond for every purpose.  
Write for Catalog No. 44 or phone HEmlock 8332.

**MOSEBACH ELECTRIC & SUPPLY COMPANY**  
1115 ARLINGTON AVE., PITTSBURGH 3, PA.

ket inorganic compounds of certain metals including tungsten, molybdenum, vanadium and others in the industrial field. J. A. Holladay has been elected a vice president of United States Vanadium Corp. and has assumed charge of this division, with headquarters at 30 East 42d St., New York City. Production and sales will be under the direction of A. J. Gailey, manager, whose headquarters address is P. O. Box 519, Niagara Falls, N. Y.

GENERAL ELECTRIC Co., Schenectady, N. Y., has appointed as assistant managers of sales J. E. N. Hume, commercial vice president and manager of the industrial divisions, and J. W. Belanger, manager of the federal and marine divisions. Karl H. Runkle has been named manager of the industrial divisions to succeed Mr. Hume and R. S. Neblett has been named federal and marine divisions manager, vice Mr. Belanger. W. V. O'Brien has been appointed manager of the central station divisions, succeeding H. V. Erben, who recently was named assistant general manager of the apparatus department.

WARREN STEAM PUMP Co., Warren, Mass., has appointed C. E. Johnson & Associates, 401 Bona Allen Building, Atlanta, Ga., as sales representative for Georgia, eastern Tennessee, northern Alabama and eastern Florida.

MARION STEAM SHOVEL Co., Marion, Ohio, has elected Maynard E. Montrose as president and general manager; J. M. Strelitz, chairman of the board and general counsel; Alec Gibson, vice president and treasurer; John P. Courtright, vice president in charge of sales; Harvey T. Gracely, vice president; M. Virden, secretary and assistant treasurer.

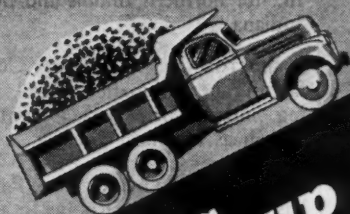
UNITED STATES RUBBER Co. has appointed Howard W. Kelsey as sales promotion manager of its general products division.

GARDNER-DENVER Co. has elected as a director Alfred Kauffmann, retired president of Link-Belt Co.

WICKWIRE SPENCER METALLURGICAL CORP., subsidiary of Wickwire Spencer Steel Co., has appointed Armon N. French as assistant sales manager, with headquarters at the company's plant, 260 Sherman Ave., Newark 5, N. J.

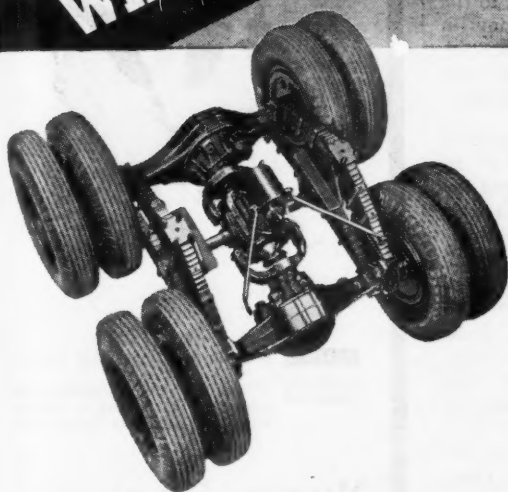
LIMA LOCOMOTIVE WORKS, INC., Lima, Ohio, has appointed the following new distributors for its shovels, draglines and cranes: McLean-Sims Machinery Co., West Madison St., Palatka, Fla., for northern Florida; State Machinery & Supply Co., 2204 Main St., Columbia 1, S. C., for State of South Carolina; G. C. Phillips Tractor Co., 1909 1/2 First Ave. North, Birmingham, Ala., for Alabama and western Florida; Martin Machinery & Supply Co., 700 Dale Ave. (P. O. Box 1787), Knoxville 1, Tenn., for central and eastern Tennessee; Modern Machinery Co., Inc., North 2417 Division St., Spokane 2, Wash., for eastern Washington, northern Idaho and western Montana; West Virginia Mine Supply Co., Box 872, Clarksburg, W. Va., for northeastern West Virginia; Chicago Construction Equipment Co., 13912 South Halsted St., Chicago 27,

# A THORNTON Converted Medium Truck

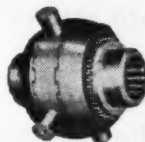


**WILL PULL 26,000 POUNDS** (G. V. W.) **up a 50% grade**

**... and speed you along  
the highway at 40-50 M.P.H.**



The THORNTON Four-Rear-Wheel DRIVE consists of 2 driving axles; 2-speed gear case assembly with Automatic-Locking Differential; "walking beam" type springs; wheels; 8 new tires.



The heart of the THORNTON DRIVE is the exclusive THORNTON Automatic-Locking DIFFERENTIAL. Centered in the inter-axle gear case, it gives both axles POSITIVE DRIVE and DIFFERENTIAL ACTION without harmful, wasteful "axle fight." Available as replacement for conventional differential in many trucks. Write for descriptive information and models available.

The ODT, recognizing the importance of the THORNTON Four-Rear-Wheel DRIVE, allots 8 new tires with each Thornton unit. You get them for your truck when the unit is installed.

NO WPB RELEASE NECESSARY

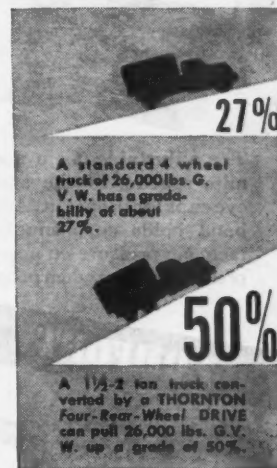


Very few truck operations ever encounter grades as steep as 50%. Yet it is comforting to know that your Thornton-equipped medium truck can climb such a grade, even when carrying a pay-load of 8 to 10 tons. This tremendous reserve of rim pull and climbing ability, made possible by Thornton's two speed gear case and two driving axles working in combination with the standard truck transmission, enables you to climb *with ease* the worst hills you ever will encounter.

With a Thornton Four-Rear-Wheel Drive installed on your 1½-2 ton truck, you also have 100% more payload capacity, plus speeds of 40 to 50 miles per hour on the highway! With 8 to 16 speeds forward, depending on the axle type, you have a suitable gear for *every* need. You get rugged, dependable performance . . . day in—day out . . . ability to walk right out of deep quarries, heavy snow, mud and muck. You keep on going in tough spots of logging, coal mining, lime spreading, oil field work and every other place where the ordinary single driving axle truck would be stalled.

The Thornton Four-Rear-Wheel Drive is the answer to every heavy trucking problem. Readily available without priority or ration release. Comes complete with 8 new tires.

Send coupon for details, advantages and performance data . . . today.



**FREE:** Mail coupon for descriptive folders and full details about the Thornton Four-Rear-Wheel Drive.



EVERY  
**THORNTON 4-Rear-Wheel DRIVE**  
INCORPORATES A  
**THORNTON Locking DIFFERENTIAL**  
ALSO AVAILABLE FOR TRUCK AXLES

## Thornton Tandem Co.

8701 Grinnell Avenue, Dept. 35, Detroit 13, Michigan, U.S.A.

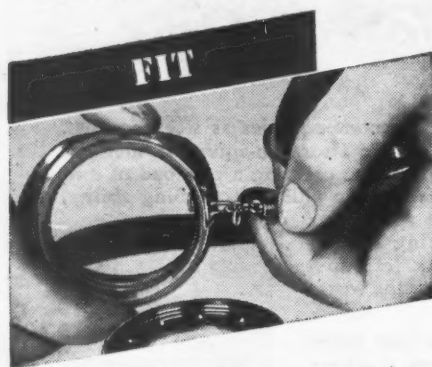
Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Make of Truck \_\_\_\_\_ Year \_\_\_\_\_  
Used for \_\_\_\_\_





Model RR50, one of more than 20 Willson Cup Goggles, meets Federal specifications for worker eye protection in chipping, grinding, riveting, sledging, snagging. The thick Super-Tough lenses of heat treated glass have high frontal impact strength. Reinforced plastic eye cups give side protection.



The adjustable chain nose bridge permits spacing of the specially shaped eye cups for proper fit. Adjustable headband holds cups snugly against the face. No pressure on nose, no high spot pressure on face when properly adjusted.



Smooth plastic eye cups with rolled edges are specially shaped to left and right eye socket contours so they always feel comfortable. Direct or indirect cup ventilation and lens ventilation assure seeing comfort and minimize lens fogging.



For help on eye protection problems, consult your Willson distributor, or write department CA-9.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

**WILLSON**  
DOUBLE  
PRODUCTS INCORPORATED  
READING, PA., U.S.A. *Established 1873*

Ill., for northern Illinois and northwestern Indiana.

BRISTOL Co., Waterbury, Conn., manufacturer of automatic control and recording instruments, has appointed C. E. Mason as technical director.

ROBINS CONVEYORS, Inc., Passaic, N. J., has elected Thomas Robins Jr. as president, vice Thomas Matchett, president since 1928, who has retired from active part in the management. Samuel Park Jr. has been added to the board of directors, the rest of whom were reelected.

COAL MINE EQUIPMENT SALES Co., Terre Haute, Ind., has purchased No. 48 mine of the Peabody Coal Co., near Dugger, Ind., which has been worked out. All the equipment, which has been removed from the operation, is to be sold for immediate delivery.

B. F. GOODRICH Co., Akron, Ohio, has appointed Ward Kenner as assistant to the president. He joined the company in 1937, becoming director of business research in 1942 and the following year assistant to the vice president for finance.

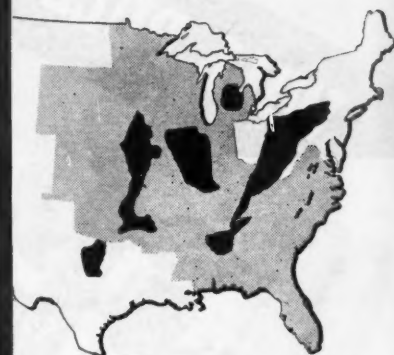
MACK TRUCKS, Inc., has appointed C. F. Larsen as service manager of its general service department. He joined the company in 1920. R. J. Meinert has returned as manager of national account sales in the central division, with headquarters in Chicago, following two years' leave of absence with the Sixth Armored Force at Camp Chaffee, Arkansas. John Walker, who joined the company's engineering department in 1918, has been appointed manager of the sales engineering department. Harry Bernard has been named director of service and service engineering with headquarters in the Long Island City plant.

ELECTRIC EQUIPMENT Co., 63 Curlew St., Rochester, N. Y., has purchased a building at 1026 Niagara St., Buffalo, N. Y., which is to be operated as a special warehouse for 25-cycle equipment, and also has acquired warehouse space at the Equipment Storage Warehouse, 7400 South Ashland Ave., Chicago, where the company's electrical equipment may be inspected at any time.

JONES & LAUGHLIN STEEL CORP., Pittsburgh, Pa., has appointed J. O'H. Anderson and H. B. Spackman as assistant general managers of sales. V. A. Jevon has been named assistant general manager of sales, in charge of Pittsburgh district sales office activities. C. T. Hapgood, formerly assistant manager of sales, tubular products, has been advanced to manager of sales, tubular products. E. W. Harwell, formerly district sales manager, Chicago office, has been made district sales manager, Philadelphia office. L. C. Berkey, formerly district manager, St. Louis office, has been appointed district sales manager, Chicago office. C. C. Wehling, formerly district sales manager, Pittsburgh office, has been transferred to the St. Louis office as district sales manager. The Chicago address has been changed to the Field Building, 135 South LaSalle St.

WORTHINGTON PUMP & MACHINERY

## SERVING Mine Operators



Majority of U. S. Coal Deposits  
Where Workmen's Compensation insurance is available through Bituminous Casualty Corporation.

MAJOR coal fields rely on the Bituminous Safety Engineers to help keep mine accidents at a minimum through practical, common sense suggestions. Years of experience have earned for these men the reputation of being leaders in this work.

**BITUMINOUS CASUALTY CORPORATION**  
ROCK ISLAND ILLINOIS

27 years of service  
to the industry

# *Preformed wire rope*

## **MULTIPLIES MANPOWER 3 WAYS**

Men who actually work with wire rope prefer preformed. They give many different reasons for this choice, but the net result is more work per line before replacement.

The men say preformed wire rope handles easier. It saves installing time; it's limber—not cranky.

They say it whips less and spoöls better on drums.

It lasts longer and this means fewer interruptions to production.

Preformed wire rope costs a little more at first but much less in the long run.

**ASK YOUR OWN WIRE ROPE  
MANUFACTURER  
OR DISTRIBUTOR**







The one thing that sustains a diver is air—and, they make sure that he gets a proper supply all of the time he is under water.

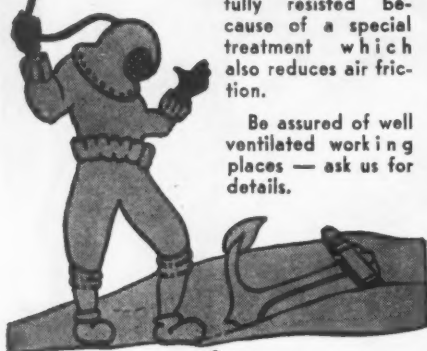
It's a similar situation underground at the working face—clean, pure air is needed at all times—and your job is to get it there.

## ABC JUTE BRATTICE CLOTH

• Resists the effects of moisture, won't shrink, therefore no air leakage.

ABC Jute Brattice Cloth resists fungi because of a compound which is formed by the chemicals used. A chemical treatment also is given this cloth so that it is flame resistant. Corrosive conditions are fully resisted because of a special treatment which also reduces air friction.

Be assured of well ventilated working places—ask us for details.



Invest in Victory  
**BUY WAR BONDS**



**AMERICAN  
BRATTICE CLOTH CORP.  
WARSAW - INDIANA**

CORP. has appointed Carl F. Oechsle vice president in charge of sales of the Ransome Machine Corp., Dunellen, N. J., a subsidiary. Sale of Ransome's line of contractors' mixers will now be handled through Worthington's equipment department, of which Mr. Oechsle is manager. Headquarters of this sales department remains in Holyoke, Mass., with regional offices in New York, Washington, Cleveland, Chicago and San Francisco.

CRANE CO., Chicago, has elected P. R. Mork as executive vice president and J. A. Dwyer as vice president in charge of sales.

WOOD SHOVEL & TOOL CO., Piqua, Ohio, has appointed William F. Ball to its sales department, where he will act as field service manager.

## Trade Literature

**CHAIN BELTS**—Chain Belt Co., Milwaukee 4, Wis. Bulletin 460 gives interesting and practical information regarding Z-metal chain belts and their application. A factor claimed for this type of casting is its remarkable resistance to corrosion due to the patented process of manufacture. Some of the more popular type chains available in Z-metal are illustrated.

**CENTRIFUGAL PUMPS**—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin B6351, on single-suction pedestal-type centrifugal pumps, points out that SS-B pumps, developed for use where close-coupled motors were not practical, are driven by electric motors, steam turbines, gasoline or diesel engines, direct-connected and through Texrope V-belts and flat belts. Included are cross-section drawings of the various pedestal types and standard specifications, which are based on the standard-construction "cast-iron bronze-fitted" pumps. Dimensions are illustrated and tabulated.

**MINING EQUIPMENT**—Lake Shore Engineering Co., Iron Mountain, Mich. Catalog 450 describes the company's mining equipment, including brief notes on three- and five-way dump cars, the Lake Shore cylinder dumper, the single-rocker dump tram car, the Lohed mine car, and the cast-iron, plate steel and plate-aluminum idler sheaves. Also featured are the gable-bottom trestle car, the roll grizzly, log washers, the Lake Shore sub-level hoist, the double Kimberly bottom skip, the combination skip and cage, snatch blocks, back scraper, head sheaves, cargo hoists, vertical cages, hoists and other equipment. Cross-reference catalog numbers are listed below appropriate illustrations to facilitate requests for detailed information.

**TRUCKS**—Euclid Road Machinery Co., Cleveland 17, Ohio. Book highlights typical applications of rear-dump and bottom-dump Euclid trucks in open-pit mining of iron ore, bauxite, titanium, cinnabar, manganese, phosphate, anthracite and bituminous coal, and in dolomite and limestone quarries.

**ELECTRIC SOLDERING TOOLS**—Ideal Commutator Dresser Co., 1292 Park Ave.,

IT'S COOL HERE

**HOTEL  
Mayfair  
ST. LOUIS**



**AIR-CONDITIONED**



3-in-1

**BLOW — CLEAN — SPRAY!  
with TORNADO**

With its 1 h.p. G.E. motor, TORNADO Portable Electric Blower blows dust, dirt and lint out of motors, generators, shafting, etc. With bag and attachments added, it is convertible into a Vacuum Cleaner, for cleaning shelves, bins, floors and light salvaging. With other attachments, it can be made into a Sprayer, for spraying insecticides. Keeps equipment and plant clean for faster production and lower costs. Saves power—reduces hazards—lowers upkeep.

Request details and  
**FREE TRIAL Offer**

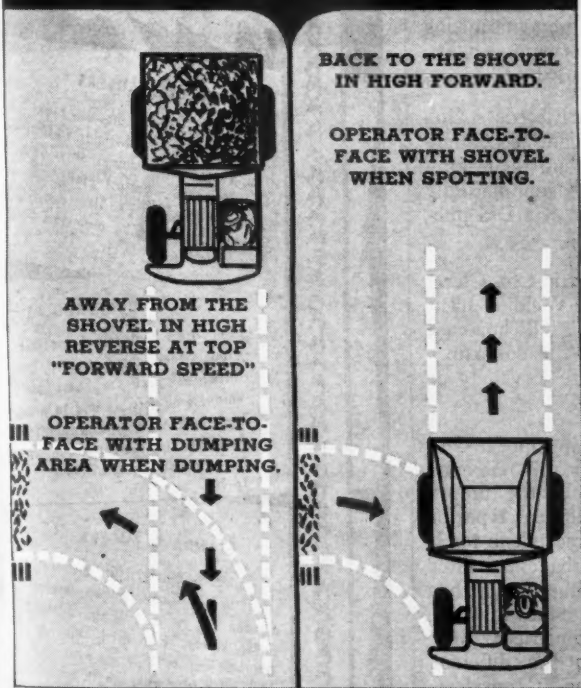
**BREUER ELECTRIC MFG. CO.**  
5098 Ravenswood Ave., Chicago 40



# FORWARD SPEEDS IN REVERSE ELIMINATE SLOW TURNS IN THE TIGHT SPOTS



**HOW DUMPTOR "SHUTTLE" RUNS  
SAVE MONEY ON TURNS . . .**



Reverse isn't s-l-o-w with the Dumptor. Three reverse speeds are fast, just as fast as the three forward speeds. Saves time on short "shuttle" runs. High Reverse away from the shovel to grizzly or tipple. Then back to the shovel in High Forward. Two slow turns eliminated. (See diagram). On longer runs, fast reverse means faster backouts, faster turns. Check time for turns on your hauling job, then figure your gains with Dumptors on the job.

**KOEHRING COMPANY** *Milwaukee 10, Wis.*

*Order Now  
for Postwar  
Delivery*



## HEAVY-DUTY CONSTRUCTION EQUIPMENT



## PROFESSIONAL SERVICES

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ENGINEERS AND BUILDERS OF  
MODERN COAL OPERATION

Authoritative Valuations, and Reports of  
Mining Properties Equipment and Opera-  
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COAL PREPARATION

To Yield Maximum Net Returns

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### SHERWIN and JANVRIN

Mining Engineers

Pineville, Ky.

Reports on COAL PROPERTIES

Planning, Construction & Supervision

### L. E. YOUNG

Consulting Engineer

MINE MECHANIZATION

MINE MANAGEMENT

Oliver Building—Pittsburgh, Pa.

Sycamore, Ill. Folder describes Thermo-Grip electric soldering tools with plier, right-angle plier, pencil, fork, straight fork and etcher attachments, providing a set for practically every soldering job.

LUBRICANTS—Hood Refining Co., Greensburg, Pa. Catalog 145 describes Gibraltar lubricants, telling what they are and what they do, also giving weight table and proportion chart.

GAS-ANALYSIS APPARATUS — Burrell Technical Supply Co., 1936-42 Fifth Ave., Pittsburgh 19, Pa. Catalog 80 describes the company's gas-analysis apparatus and accessories; also contains a manual for gas analysts.

WELDING OR CUTTING UNIT—Victor Equipment Co., 844-54 Folsom St., San Francisco. Bulletin Form 1, entitled "Setting Up a Victor Welding or Cutting Outfit," describes and illustrates how to assemble and operate a Victor welding or cutting unit, also suggesting nozzle or tip size selections for various metal diameters to be welded or cut. A few important "don'ts" are given to help avoid hazardous practices.

FIRE EXTINGUISHERS—Randolph Laboratories, Inc., 8 East Kinzie St., Chicago 11, Ill. "Fire Extinguisher Installation Guide," 8½x20 in. chart, divides fires into the standard "A," "B" and "C" classifications, with large illustrations of typical fires in each division. Also pictured are the extinguishers to be used, including carbon dioxide, vaporizing liquid (carbon tetrachloride), soda-acid, foam and pump tanks. Quantity copies obtainable without charge.

RUBBER ADHESIVES—B. F. Goodrich Co., Akron, Ohio. Booklet gives facts about natural and synthetic rubber cements, telling how to choose the right kind for each application, outlining the difference between vulcanizing and non-vulcanizing types and giving data on cement weights, colors and base materials used.

SWITCHES—Delta-Star Electric Co., Chicago 12. Automatic high-speed, high-voltage grounding switches and their applications are discussed and diagrammatically shown in the April number of a D-S publication.

WELDING—Lincoln Electric Co., Cleveland 1. Bulletin 405, "101 Welding Ideas for Low-Cost Maintenance," tells how and why it is done, describing the company's equipment for repairing a wide variety of equipment.

FILTER LENSES—American Optical Co., Southbridge, Mass. Carboard reference chart for welders points out the proper shades of filter lenses for different types of welding operations. In oxyacetylene torch cutting and welding, the shades of filter lenses are classified according to whether the cutting or welding is light, medium or heavy. The shades for electric welding are classified according to the different diameters of the welding rods; consideration also has been given to the use of carbon, helium and atomic hydrogen arcs. Wherever possible, a choice of shades is given because of each individual's varying sensitiveness to light.



Thousands of miners are still wearing Portable Cool Caps, purchased six to eight years ago. In addition to long life, safety and comfort, Cool Caps offer:

ONE PIECE, MOLDED FIBRE CROWN:

With Nine Arched Flutes to Increase Strength by at Least 50%.

PATENTED VENTILATION: Keeps the Head Cooled to Mine Temperature.

THE FLEXO-BAND: Assuring a Perfect Head Fit Without Pressure.

Cool Caps are available with or without lamp bracket or with special attachment for carbide lamps. Write or phone GRant 1061.

HEADQUARTERS FOR SAFETY EQUIPMENT FOR MINES AND INDUSTRY

Portable Products Division

**PORTABLE**   
**PRODUCTS CORPORATION**

Formerly Portable Lamp & Equipment Company  
420 Blvd. of the Allies, Pittsburgh 19, Pa.

## HERCULES Augers

### HERCULES AUGERS

Ideally suited to modern high speed drills — withstand whips and torsional strains. May be resharpened — outlast four to five ordinary drills. Sizes available up to 3" diameters — lengths up to 16 ft.

### BLACK DIAMOND AUGERS

Made from high-carbon crucible grade steel — heat treated to insure as much toughness and hardness as possible and to prevent broken tangs and points. Available in diameters up to 2" — maximum over-all lengths, 16 ft.

### STANDARD AUGERS

Developed originally for use with hand drills. These augers recommended for hand drilling, drilling under stumps and ditch blasting. Diameters up to 2" from oval steel, 7/16" thick, maximum length ten feet.

**SALEM TOOL COMPANY**  
SALEM OHIO

# BEARING COSTS TOO HIGH ?

*Simplify the Loads with*

## ROLLWAY

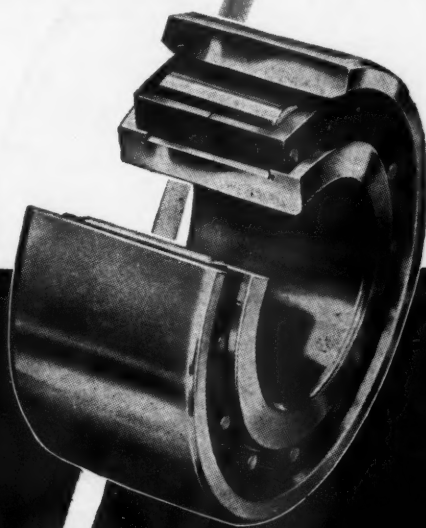
**RIGHT-ANGLE LOADING**

Yes, simplify the load and simplify the design . . . and get longer bearing life. It is easy with Rollway Bearings because Rollway Right-Angle Loading not only gives you the higher capacity of solid cylindrical rollers, it reduces the unit loads. That's because Right-

Angle Loading splits compound loads into the two simple components of *pure radial* and *pure thrust*—each carried on a separate bearing assembly. Thrust cannot pile up on radial bearings, and vice versa. There are no oblique loads, no resultants—just simple forces acting at right angles to the roller axes. Factors of safety can be lower . . . housings simpler and more compact. Maintenance work and down-time for maintenance are both reduced.

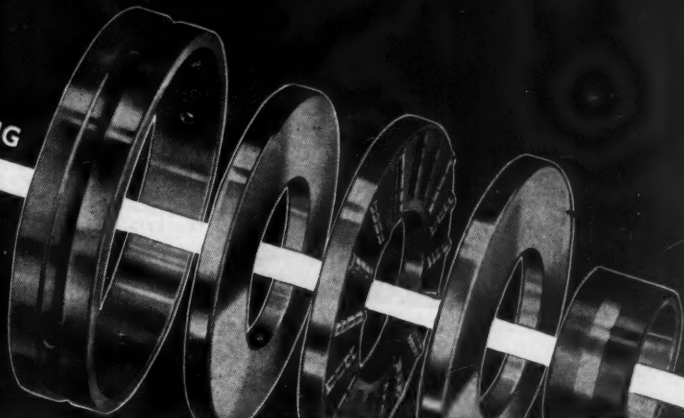
**ROLLWAY BEARING COMPANY, INC.**

*Syracuse, N. Y.*



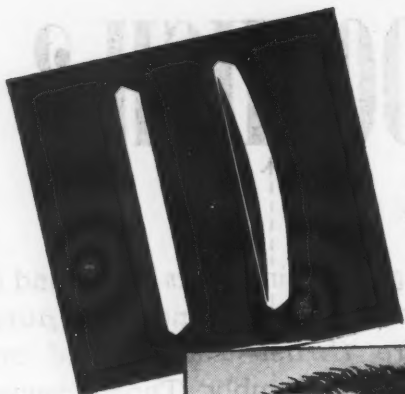
Let our engineering specialists analyze your problem and recommend the types and series best suited to your need. No charge or obligation. Just send a drawing or detailed design. S.A.E. or American Standard metric dimensions and tolerances are available for most applications, assuring quick supply and low cost.

ROLLWAY RIGHT ANGLE LOADING

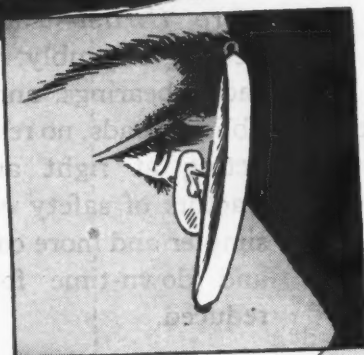


SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles





The deep curve of the lens gives over twice the impact resistance of regular safety lenses. Workers' eyes are safer.



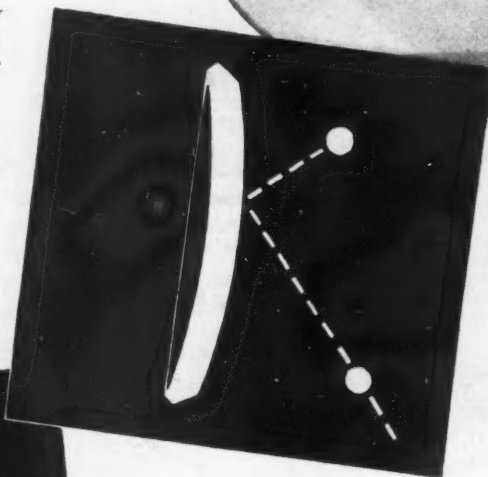
The curved shape of the lens permits closer fitting to the eyes for maximum protection, yet gives ample clearance for long lashes.

## AO 6-CURVE SUPER ARMORPLATE LENSES

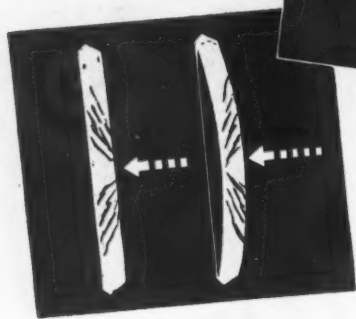
**Save More Eyes...More Dollars**

All your workers can enjoy the benefits of the lens that provides more than twice the resistance of regular protection lenses . . . the more certain deflection of flying particles . . . the tendency of the glass fragments to be wedged out and away from the eyes if the lens is fractured by an irresistible blow . . . the clear, normal, comfortable vision.

With all these advantages—your eye-protection costs will be lowered and company profits more secure. Remember—eyes are expensive targets—protect them with 6-Curve Super Armorplate lenses. Available in clear or calobar.



The curve of the lens aids in deflecting particles. Many blows that might fracture regular safety lenses are deflected by 6-Curve Super Armorplate Lens.

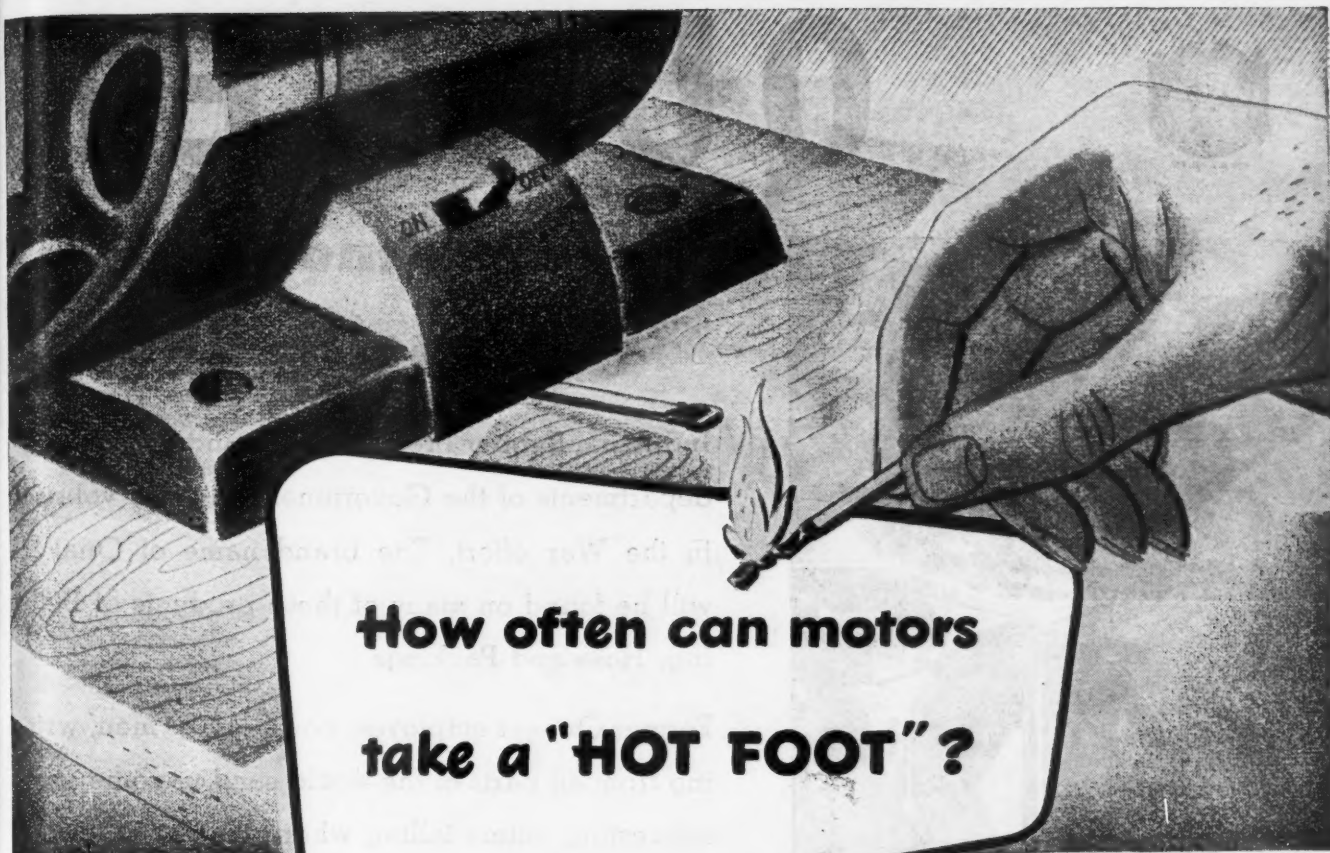


Glass fragments tend to be wedged away from the worker's eye if lens is fractured by an irresistible blow. Workers' eyes are safe.

American  Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS



## How often can motors take a "HOT FOOT"?

Overloads, dirt, corrosive acids, heat, moisture *and the human element* can all play tricks on even the best designed motors. Any one, or a combination of them, can give your motor a "hot foot" once too often, then — failure.

Most motors are designed, by experts, to do their specific jobs efficiently. Most of them are built to give trouble-free service and to operate economically. Without the motor manufacturers' design and production skill American industry would be at a standstill today. Yet, the records show that motor failure still imposes an extremely heavy time and dollar loss on every industry.

Fiberglas\* Electrical Insulation Materials have proved their ability to protect motors of all types from the conditions which cause a majority of the failures. They provide that "extra" protection which assures longer, more economical operation and decreases down time and its consequent production losses.

### Fiberglas Insulation cuts rewind shutdowns

Typical of the advantages which Fiberglas Insulation provides is this experience of a concern in the metal-working industry.

A manufacturer of automotive parts

was using 3 h-p, squirrel-cage, 3600 rpm motors to drive fans for operator and hot stock cooling. The motors were operated in high ambient temperatures and exposed to dust, grit and metal scale. The motors were failing at sixty-day intervals. Operators complained and the production line was slowed down while motors were being replaced and rewound.

Then these motors were rewound with the same size and type of wire, but with Fiberglas Insulation throughout. They have been in operation for over a year, with no failures to date.

And remember,



the only added cost in rewinding with Fiberglas is the slight difference in the cost of the insulating materials.

Fiberglas Electrical Insulation Materials, in plain and treated forms, are available now. For complete information consult your distributor or write for new catalog, *Owens-Corning Fiberglas Corporation, 1862 Nicholas Bldg., Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

\* \* \*

### BE SURE TO SEE THE FIBERGLAS ELECTRICAL INSULATION MATERIAL EXHIBIT

THE NEXT SHOWINGS ARE: Mushlebach Hotel, Kansas City, April 17-18; Hotel Adolphus, Dallas, April 24-25; Hotel Rice, Houston, May 1-2. Appearances in other cities will be announced later.

ASK FOR FIBERGLAS—IN YOUR NEXT NEW MOTOR—AND ON YOUR NEXT REWIND

# FIBERGLAS

\*T. M. Reg. U. S. Pat. Off.

## ELECTRICAL INSULATION



### THERE'S A COMPLETE LINE OF FIBERGLAS ELECTRICAL INSULATIONS

YARNS • TAPES • CORD • SLEEVING • CLOTH AND OTHER FORMS. Also available in: Magnet wire, Lead wire, Special wires, Varnished cloth and tape; Mica Combinations: Laminates, Saturated sleeving, Varnished tubing, Pressure sensitive tapes, Special products.





# QUAKER

## the well-known name in Rubber

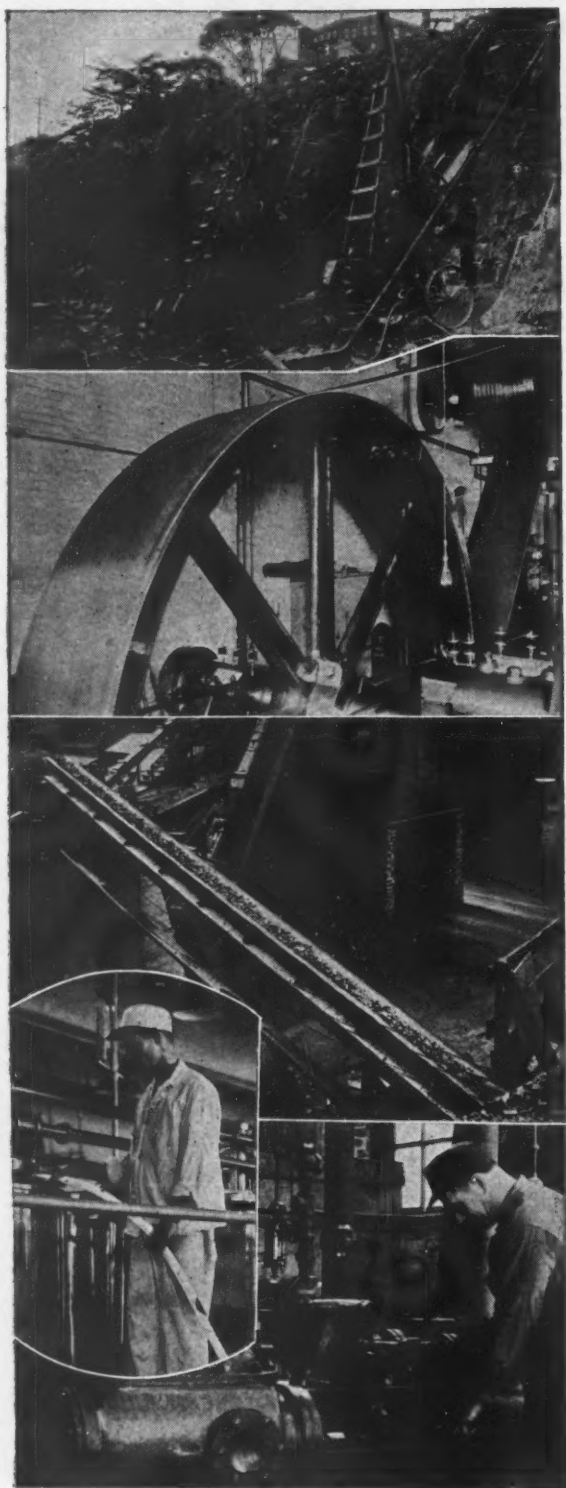
Industrial Rubber Products are going to the many departments of the Government in large volume in the War effort. The brand name of Quaker will be found on many of these products of Belting, Hose and Packings.

Former Quaker employes, now Service men, writing from all parts of the world send us some very interesting letters telling where they see Quaker products in use, and how they are helping in the war effort. Much of Quaker's production is going to such destinations. There is not as much left for civilian users as we would like.

The day cannot come too soon for us so that Quaker can devote all our facilities to the turning out of products for civilian use.

This war has brought us face to face with shortages in many of our accustomed essential products in food, clothing and many of what we formerly considered necessities. Some day there will be enough Industrial Rubber Products to meet all demands.

It is good policy to keep on asking for Quaker—the name that stands for Quality Industrial Rubber Products.



*"If there is a way to get it done  
—Quaker will do it"*

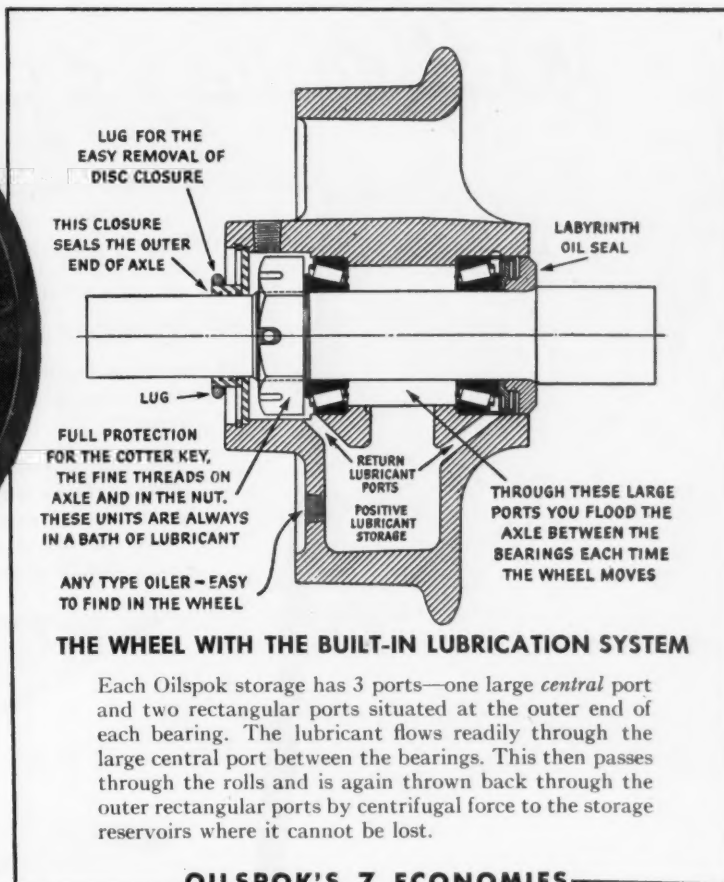
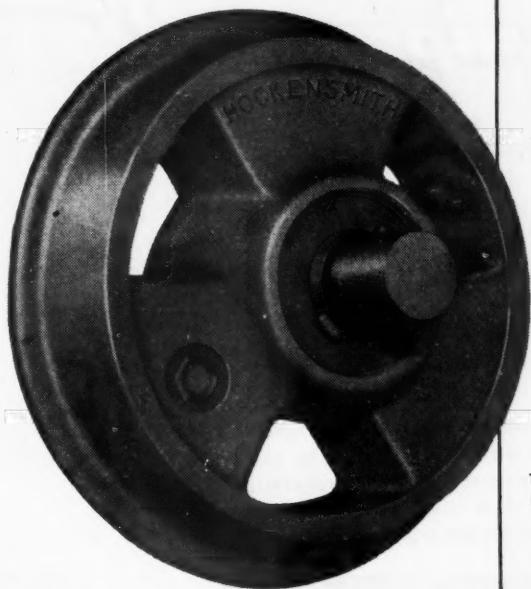
## QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1  
Western Territory  
QUAKER PACIFIC RUBBER COMPANY • SAN FRANCISCO 5 • LOS ANGELES 21

# A NEW OILSPOK WHEEL

... for 4-AXLE CARS

Both Ends Sealed . . .



## THE WHEEL WITH THE BUILT-IN LUBRICATION SYSTEM

Each Oilspok storage has 3 ports—one large *central* port and two rectangular ports situated at the outer end of each bearing. The lubricant flows readily through the large central port between the bearings. This then passes through the rolls and is again thrown back through the outer rectangular ports by centrifugal force to the storage reservoirs where it cannot be lost.

## OILSPOK'S 7 ECONOMIES

- 1. Increased wheel life.** Excessive tread wear is eliminated by the free-flowing lubrication.
- 2. Saves power.** Free wheel rotation means no power lost by churning grease. Lubricant in "Oilspok" wheel is fluid and free-flowing.
- 3. Saves lubricant and lubricating labor.** "Oilspok" lubrication is positive and continuous—no loss due to pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.
- 4. Longer bearing life.** Bearing lubricant is constantly changed—bearings clean and cool—constant circulation—no replacements.
- 5. Increased axle box life.** "Oilspok" wheels are free turning under all temperature conditions.
- 6. Especially Efficient in Small Diameters.** Small diameter wheels for heavy loads increase the friction necessary to move them with grease lubrication. Oilspok wheels with positive circulating lubrication provide a freer running car, saving bearings.
- 7. Stronger wheel—no extra weight.** "Oilspok" wheels have tapered box section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing sizes.

*This Oilspok wheel can be furnished for use on your present equipment.*

The performance and cost-saving advantages of Oilspok wheel automatic lubrication are now available to owners of 4-axle cars. This new stub axle Oilspok wheel with its continuous, free-flowing, positive lubrication is designed with nut end completely sealed by a disc closure which protects the fine threads in the nut and on the axle. The nut, axle end and cotter key are always in a bath of oil. The labyrinth seal effectually prevents loss of lubricant at the flange end of the wheel hub.

The disc closure (shown above) forms a seal over the axle, preventing leakage of the lubricant up to the line of the axle. The disc is of cold rolled sheet steel and is machined on its outside diameter for slip fit, which makes an oil tight seal. Two lugs, welded to an extension collar on the disc, make it easy to remove when necessary.

The construction of Oilspok storage reservoirs with thin walls forming their sides, provides for uniform chilling of the entire wearing tread. This adds strength to the wheel and assures longer life.

Oilspok 4-axle car wheels are made for both standard and labyrinth enclosures. Wheels can be made spoke type, single or double web as desired.

Save wheel costs, and prepare for post-war operations by installing Oilspok wheels now. Write for full information.

HOCKENSMITH WHEEL & MINE CAR COMPANY  
Established 1877, Penn., Pa., Phone Jeannette 700.

# Hockensmith "Oilspok" Wheels

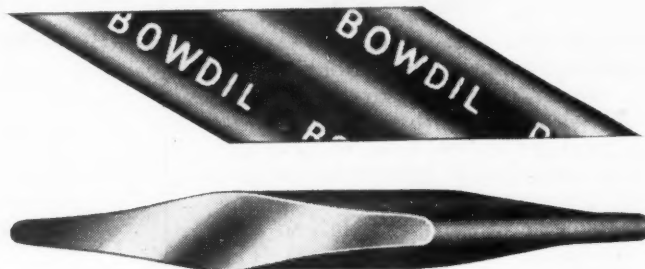
Also Builders of All Types of Hydraulic Dump Bodies, Penn Telescopic Hoists and Industrial Cars



# What makes **BOWDIL** the best Coal Cutting Equipment?

BOWDIL'S reputation as a manufacturer of the finest coal cutting equipment is built on:

1. Knowing the needs of our market . . . and designing equipment to meet those needs!
2. The maintenance of high quality standards, both in material used and in our methods of manufacture. Only specially selected metal is used and tolerances are rigidly controlled.



Worthy of your special attention are the BOWDIL Concave Cutter Bits shown here. Their design permits wearing them down 25% farther than standard bits, *without increasing power demands or dust*. It's the design and construction of the bits that gives these results. BOWDIL Bits are rolled with concave faces, thus giving ample clearance, reducing power requirements and giving 20% longer use. Actual job-results have proven that BOWDIL Bits cut 3 to 5 times more places and insure 25% to 30% more coarse cuttings. Specify these finer bits for your operations *now*. Write for complete details today—let BOWDIL help you solve your coal cutting problems. Address the BOWDIL Company, Canton, Ohio.

## **bowdil**

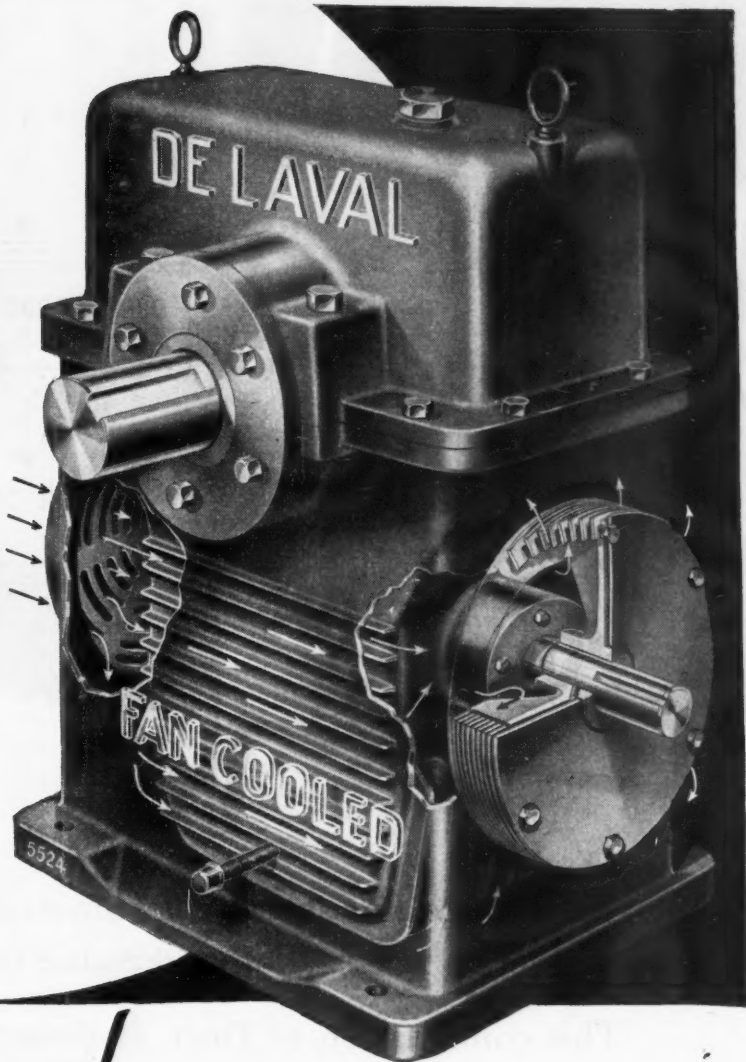
*"Headquarters for Coal Cutting Equipment"*

**Canton**

**Ohio**

# NEW DE LAVAL

## FAN COOLED WORM GEAR



*Lifts ceiling  
on capacity ratings!*

Heretofore the capacity of non-cooled worm gears has been limited, not by the strength of materials, but by the ability of the casing to liberate heat. With fan-cooling, the capacity is approximately doubled at speeds at 1750 r. p. m. Higher ratings, in turn, permit the use of smaller, lighter, and less expensive units without sacrifice of durability or reliability. • A fan mounted directly upon the high speed shaft draws air at high velocity around and under the ribbed inner wall of the oil reservoir. The ribs increase the heat dissipating surface, while the outer housing serves to confine and direct the air stream, thus cooling the unit most efficiently. • Stock models will soon be available. Ask to have your name placed on our mailing list for literature.

1151

TURBINES • HELICAL GEARS and  
WORM GEAR SPEED REDUCERS  
CENTRIFUGAL PUMPS • CEN-  
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WORM GEAR DIVISION

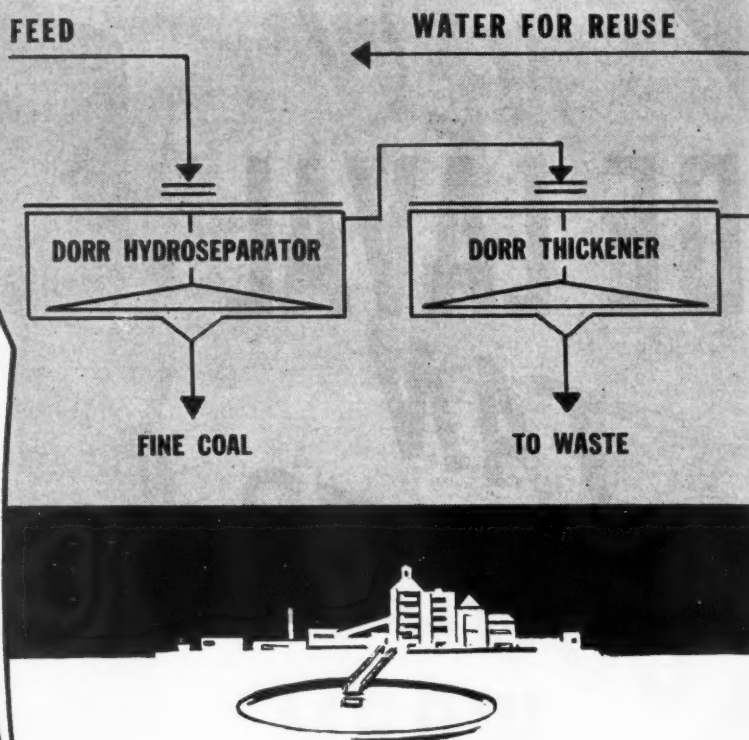
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SOLUTION  
to stream  
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This simple flowsheet will eliminate stream pollution while recovering fine coal of marketable size.

This combination of Dorr Hydroseparator and Dorr Thickener performs two important jobs:

Used wash-water is clarified for re-use—a possible economy depending on certain local conditions.

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Stream pollution, loss of fine sizes, excessive costs—all three are eliminated with this one Dorr installation.



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**A**N APPLICATION of these wear-resistant alloys will result in a definitely longer life for equipment subject to wear and abrasion. Among the most popular Stoody alloys are:

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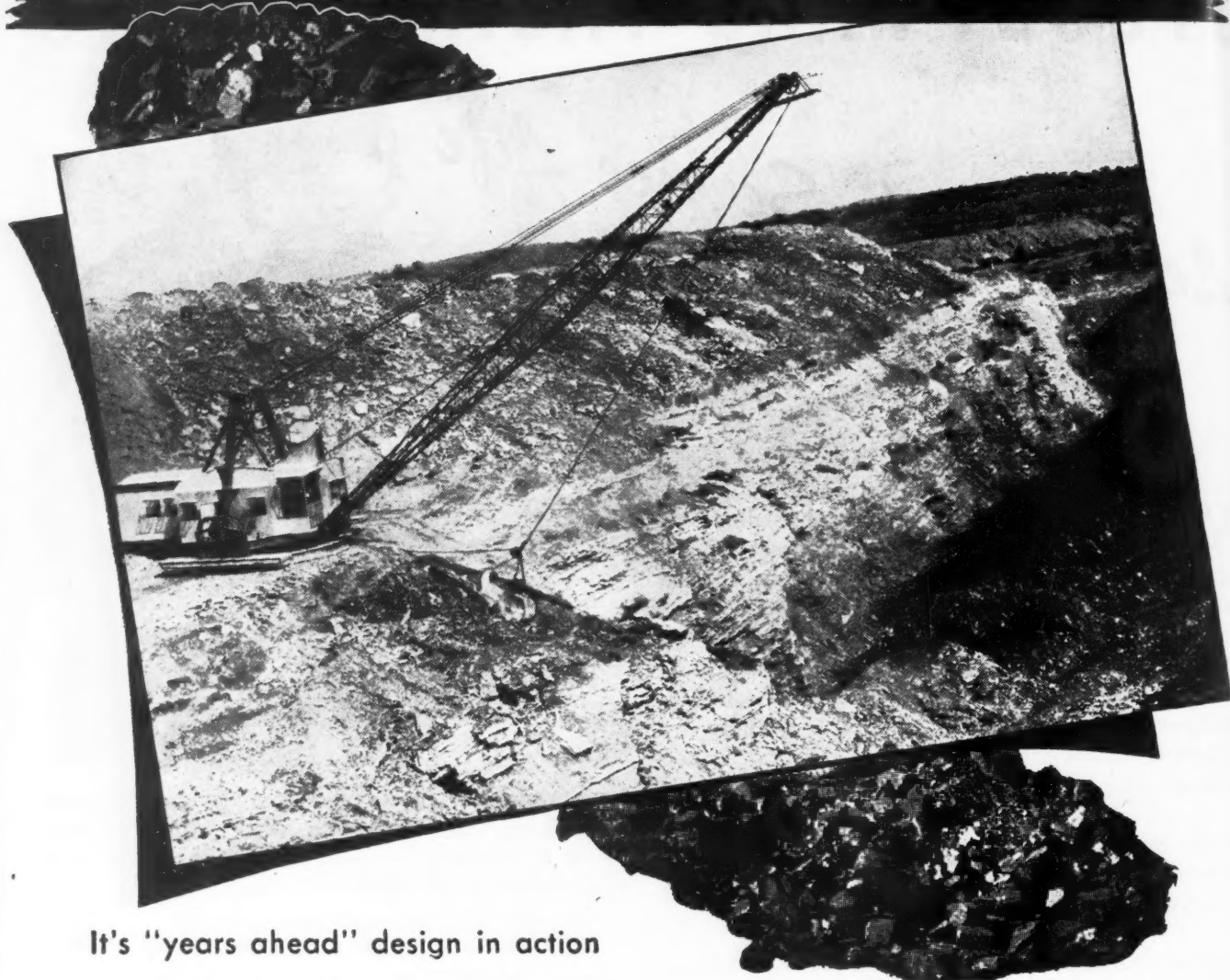
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It's "years ahead" design in action as war-working Bucyrus-Monighans peel off yard after yard of overburden and remove the barrier to vital coal. Long reach . . . fast-action digging and swinging . . . smooth walking traction that means all-weather performance . . . construction so simple that maintenance has to be low . . . All these combine

to keep Bucyrus-Monighans producing at top speed during the long war years. With Bucyrus-Monighan-accelerated stripping, the steady flow of coal continues . . . brings nearer the conclusion of our Axis-smashing job.

1M45



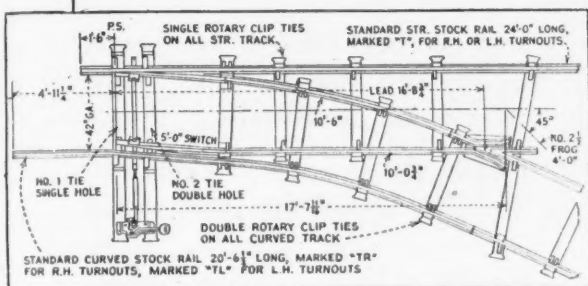
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# More Coal... Out Faster... Less Labor

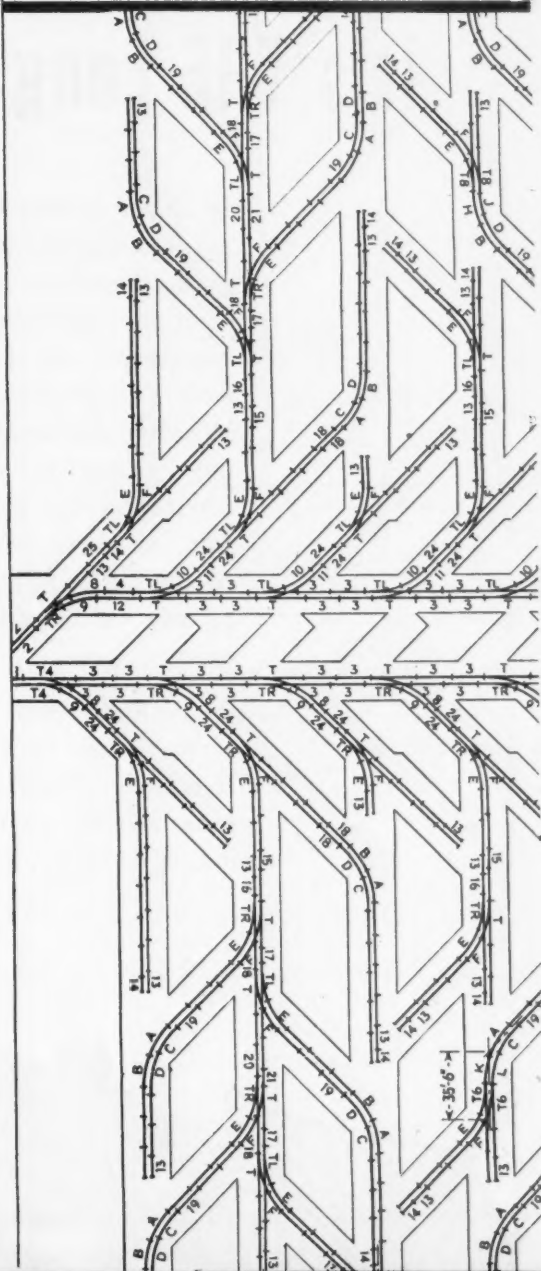
## with "WEST VIRGINIA"

## Prefabricated TRACK AND EQUIPMENT

Diagrammed below is a standard turnout unit of "WEST VIRGINIA" Prefabricated track. Also shown is a typical mine layout, using this equipment. "WEST VIRGINIA" Prefabricated track saves track-laying time, eliminates the problem of make-shift track and makes it possible to bring more coal out per shift.



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# WEST VIRGINIA STEEL & MFG. COMPANY

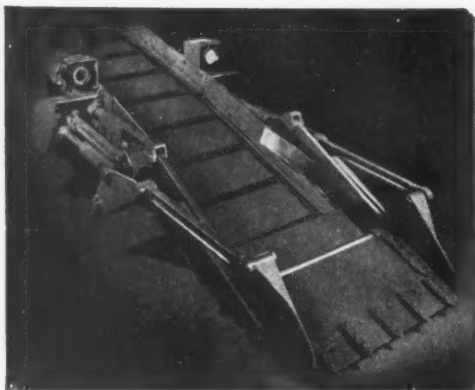
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## HUNTINGTON



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The loader with the natural, smooth, easy, shovel-action loading head.

## It's THE Long Life Mechanical Loader

★ Never before have mechanical loaders had to meet the demands made necessary by this war's production requirements. Such hard, consistent service, has never before been so essential, but, the Whaley "Automat" is daily shoveling its way to an even greater reputation for increased production, at lower costs, standing up to double and triple shift service as only the "Automat" is capable of.

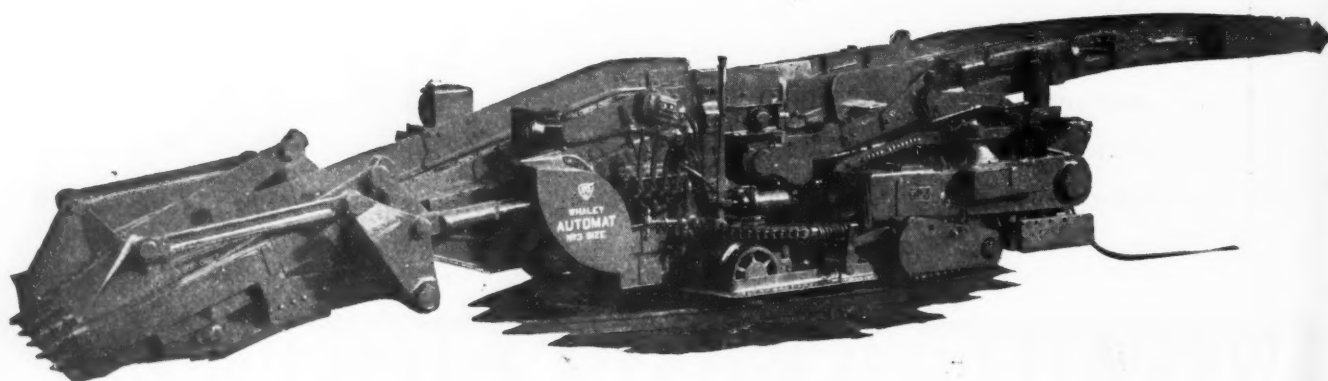
These demands have produced further proof that the "Automat" is equally efficient in coal, whole seam mining, or rock work, loading, in its stride, any lumps of coal

that can pass through the tipples, or any size rock that cars, aerial trans or larries can take.

It is the smooth precision-like, exclusive, shoveling action of the "Automat" that accounts for its long life of faithful service. Production demands today are final proof of its dependability. Not just for today, but for tomorrow, when any savings may look big in a highly competitive market.

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*Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for manufacture and sale in Great Britain and Europe.*



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***Mechanical Loaders Exclusively  
For Over 37 Years***



For preparing Mine-loaded R. O. M. for Washer treatment, the "Pennsylvania" Bradford does an outstanding job.

## REMOVING HEAVY MINE ROCK FROM R. O. M.

175 tons R. O. M. hourly is being *mechanically loaded* at this large Southern Mine.

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Prior to washing for Coking, this Bradford is automatically removing 35 tons hourly of large Rock, as shown on the above 30" Conveyor Belt.

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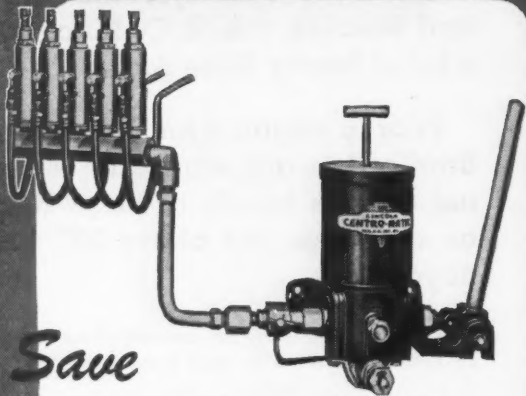




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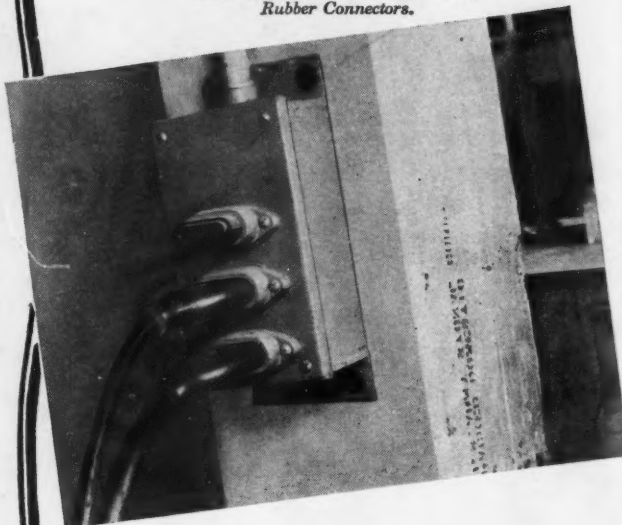
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Photo shows multiple distribution center application of Mines Molded Rubber Connectors.



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**Designed For Any Portable  
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Many types and sizes of Mines Molded Rubber Connectors have been developed, making them adaptable to almost any application where power is transmitted by portable cable. Stationary receptacles are also available for each portable type.

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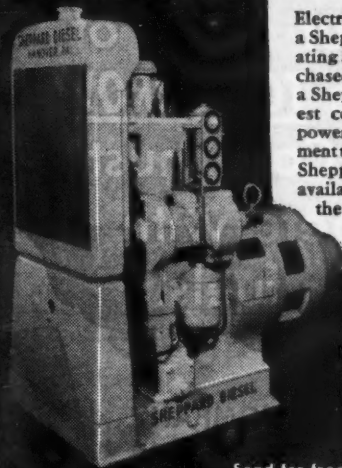
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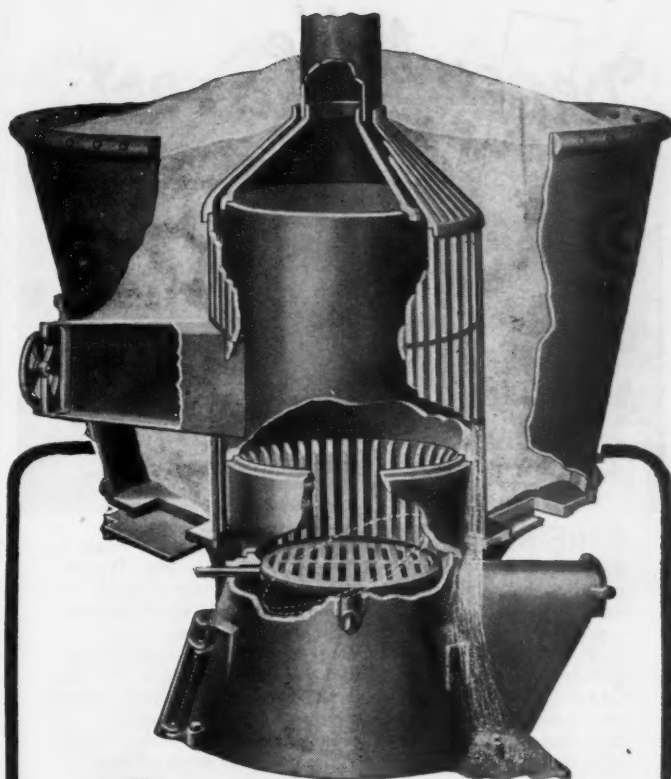


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## AUTOMATIC SAND DRYER

**Reduces Fuel Costs for Drying Sand**

The operation of the Viloco Sand Dryer is automatic—sand flows freely through the grating as it dries. The grating is so constructed that it prevents wet sand coming in contact with the stove. Plenty of cleaning slides are provided around the hopper base for ready removal of any material that cannot pass through the grating. The fire grate can be removed through the ash door. Parts of stove subjected to fire are made of Chrome Nickel Heat Resisting Iron.

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# VILOCO

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Can a miner live in air in which the oxygen content is reduced to 17 per cent?

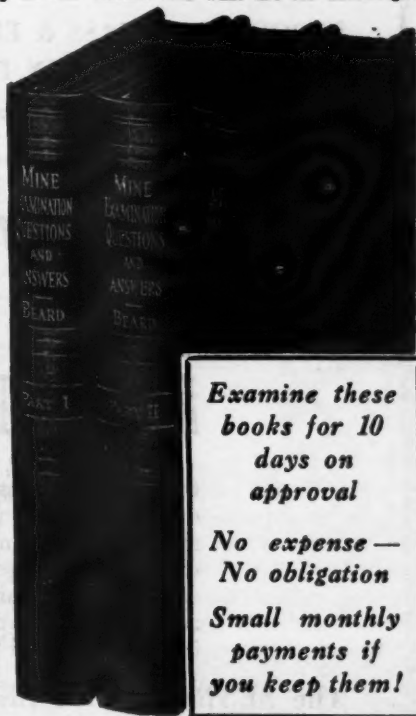
Name five duties imposed on mine foremen by law?

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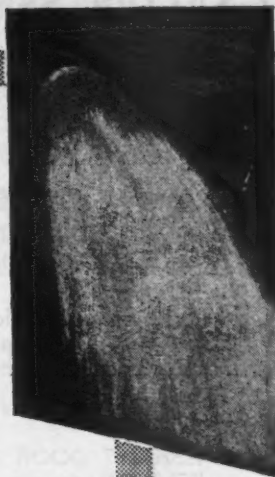
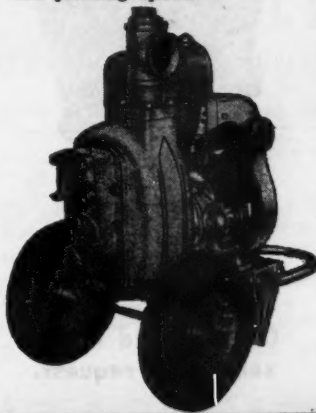
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NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

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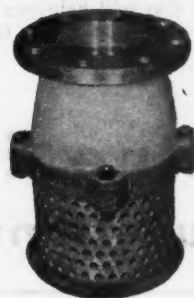
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Size	Height	Maximum Diameter	Weight
2"	6 3/4"	6 1/2"	17 lb.
2 1/2"	9"	8"	20 lb.
3"	9 1/4"	8"	20 lb.
4"	10"	8 3/4"	30 lb.
5"	12 1/4"	11 1/2"	55 lb.
6"	13 1/2"	11 1/2"	70 lb.
8"	13-13 1/8"	16 1/2"	130 lb.
10"	13-13 1/8"	16 1/2"	140 lb.

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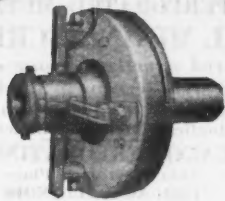
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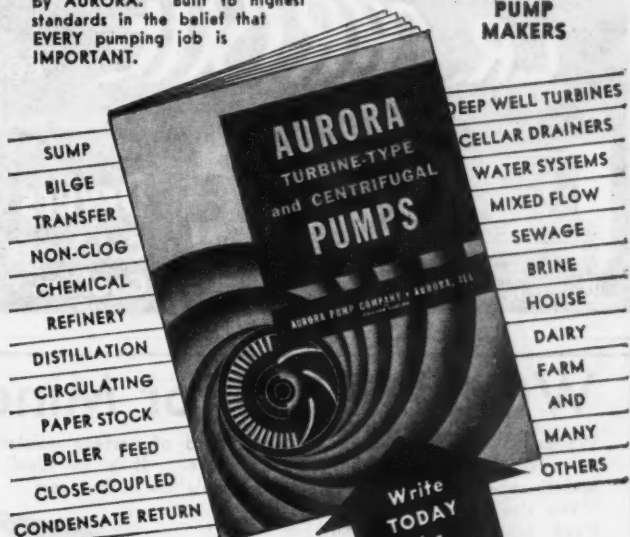
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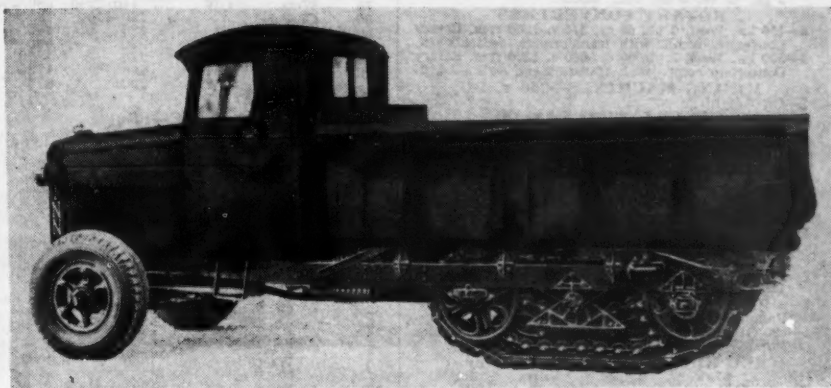
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100	West.	CW	220/440	685
75	West.	CW	220/440/2200	580/290
50	Chand.		220/440	1800
50	Allis Chas.		220	490
30	West.	CW	220	900
30	West.	CW	220	1900
20	West.	CW	220	1735
15	West.	CW	220	870

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HP	Make	RPM	Type
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1 1/4	West.	2200	SK
1 1/2	West.	900	CD
1 1/2	Robbins Myers	1750	
1 1/2	Master	3450	DM
2	Thompson	1100	
2	Northern	1000	
2	Reliance	850	
3	G.E.	1700	RC-25
3	West.	850	CD
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	840	SK
5	West.	850	
5	West.	1600	RC
7 1/2	Cr. Wh.	875	
10	West.	1325	S

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10	Cr. Wh.	675	RC
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15 1/2	West.	965	DL
35	G.E.	900	

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1	5	2300	220/440	G.E.
1	5	2200	110/220	West.
84	7 1/2	2200	220/110	G.E.
32	7 1/2	2200	220/110	West.
12	10	2200	220/110	West.
13	10	2200	220/110	G.E.
2	15	400/30000/50000	220/460	American
2	15	2300	230/460	American
1	20	2300	110/230	West.
2	25	2300	230/460	American
1	25	2200/1100	220/110	West.
1	25	2200	220/110	G.E.
1	35	220	110	West.
1	50	2200/110	220/110	West.
3	50	6600	575/440/220	G.E.
2	50	6600	550/440	Pgh.
2	50	6600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
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Vulcan 25 ton Steam Loco. std. ga. side tank  
Whitcomb 14 ton 36" gauge Diesel Loco.  
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WE WILL FIGURE WITH YOU ON  
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**AMERICAN RING CRUSHER**  
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**IMMEDIATE DELIVERY**  
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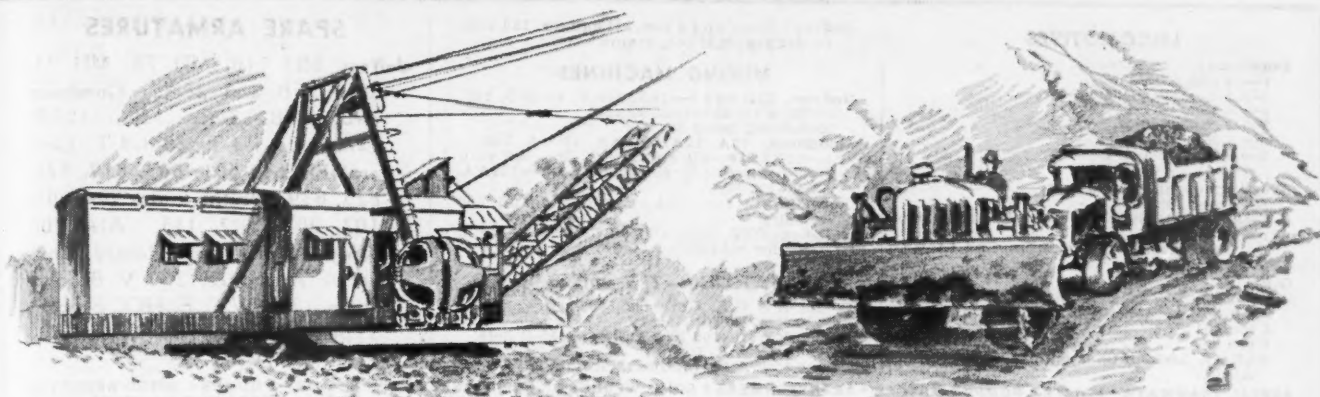
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4 Track coal tippie, frame construction, bolted for quick removal and re-assembly. Equipped with 5 car (2 ton) rotary dump, reciprocating feeder, belt conveyors, picking table, shaking screens, double deck vibrating screen 4' x 8', Jeffrey bucket elevator, three apron loading booms, two electric boom hoists, 18" x 30" double roll crusher, car retarders bins, chutes, etc. Fine for strip or deep mine. Mine locomotives, mining machines, loading machines, drills, mine cars, rail, pumps, generators, underground conveyors, electric motors, steam "dinky" locomotive, miscellaneous. Will sell, or lease.

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Look over these lists—then write for an inspection of all equipment which interests you. Or, better yet, give us a phone call—for quick action.

## TRACTORS

- 1—RD7 Caterpillar Tractor with LaPlante-Choate Angledozer.
- 1—D8 Diesel Caterpillar Tractor with LaPlante-Choate Hydraulic Bulldozer.
- 1—RD4 Caterpillar Tractor.
- 1—75 Diesel Caterpillar Tractor with LeTourneau Double Drum Winch, Lights and Generator.
- 1—20 Ton Tractor and Semi-Trailer. Diamond T Truck—22' Semi-Trailer.
- 1—60 Caterpillar Tractor without bulldozer and pull type grader.
- 1—60 Caterpillar Tractor with bulldozer.
- 1—60 Caterpillar Tractor.

## 1 1/4 YARD SHOVELS

- 1—1 1/4 Yd. Byers Shovel—Model 125. Re-built.
- 1—1 1/4 Yd. Lima Shovel. Good condition.
- 1—1 1/4 Yd. Lima 101 Shovel.
- 1—1 1/4 Yd. Linkbelt Shovel-Crane combination. 60' Boom.
- 1—1 1/4 Yd. Lorain Model 75 Crawler Shovel.
- 1—1 1/4 Yd. Lorain Shovel. Good condition.
- 1—1 1/4 Yd. Lorain Shovel.
- 1—1 1/4 Yd. Lorain 75A Shovel.
- 1—1 1/4 Yd. Lorain Shovel. Good condition.

## 1 YARD SHOVELS

- 1—1 Yd. Northwest Model 105 Shovel.
- 1—1 Yd. Osgood Shovel Model JMS Conqueror.
- 1—1 Yd. Osgood Shovel.
- 1—1 Yd. Bucyrus-Erie Shovel.
- 1—1 Yd. Koehring Model 301 Shovel.
- 1—1 Yd. Marion Gas-Electric Shovel Model 450.

## 1 1/2 YARD SHOVELS

- 1—1 1/2 Yd. Koehring Model 501 Dragline.
- 1—1 1/2 Yd. Lima Model 601 Shovel and Dragline Combinations.
- 1—1 1/2 Yd. 75B Lorain Shovel, Cummins Diesel Engine.
- 1—1 1/2 Yd. Lorain 75D Crane-Dragline combination.
- 1—1 1/2 Yd. Lorain 77 Diesel Shovel.
- 2—1 1/2 Yd. Marion Shovels.
- 1—1 1/2 Yd. Marion 362 Combination. Diesel powered.
- 1—1 1/2 Yd. Northwest Shovel.
- 1—1 1/2 Yd. Northwest Model 104 Crane.
- 1—1 1/2 Yd. P&H Model 700.
- 1—1 1/2 Yd. P&H 700 Combination.
- 1—1 1/2 Yd. P&H Model 700 Shovel.

## 2 1/2 YDS. TO 7 YDS. ELECTRIC SHOVELS & DRAGLINES

- 1—2 1/2 Yd. Bucyrus-Erie 75B Full Electric Shovel and Dragline.
- 2—2 1/2 Yd. Marion Electric Shovels. Ward-Leonard Controls.
- 1—2 1/2 Yd. Model 1250 P&H Electric Shovel.
- 1—2 1/2 Yd. P&H Electric Shovel.
- 1—3 Yd. Monighan Electric Dragline Model 3T.
- 1—4 Yd. Bucyrus-Erie 100B Shovel and Dragline Combination.
- 1—4 Yd. Bucyrus-Erie 120B Electric Shovel.
- 2—4 Yd. Marion Model 125 Electric Shovels.
- 1—4 Yd. Marion Model 4160 Electric Shovel. Ward-Leonard Controls.
- 1—4 1/2 Yd. Bucyrus-Erie 120B Electric Shovel and Dragline Combination.
- 1—5 Yd. P&H Model 1500 Electric Shovel.
- 1—4 Yd. P&H Model 1400 Electric Dragline. Ward-Leonard Controls.
- 1—6 1/2 Yd. 320B Bucyrus-Erie Electric Shovel.
- 1—6 1/2 Yd. 320B Bucyrus-Erie Electric Shovel.
- 1—7 Yd. 175B Bucyrus-Erie Electric Shovel.
- 1—7 Yd. 175B Bucyrus-Erie Shovel only.

## 3 TO 4 YD. DRAGLINES

- 1—3 Cu. Yd. Bucyrus-Monighan Dragline.
- 1—3 Yd. Marion Model 369 Diesel Combination.
- 1—3 Yd. Marion 40A Dragline. Diesel Powered.
- 1—3 Yd. Marion 40A Stripping Shovel Dragline Combination. Diesel Powered.
- 1—3 Yd. Monighan Dragline.
- 1—3 Yd. Diesel Monighan Dragline.
- 1—3 Yd. Monighan Walker Dragline.
- 1—3 Yd. Diesel Dragline Page Model 220.

## DUMP TRUCKS

- 4—Euclid Model 5FD 15-Ton End Dump Trucks.
- 3—14 cu. yd. Large "Earthmover" Oshkosh Tractor Wagons—Bottom Dump.
- 2—Euclid Diesel End Dump Trucks—10 Yd.
- 1—10-Ton A.C. Mack Dump Trucks.
- 1—8 Yd. Sterling Model D.C. 25 Dump Trucks. Heil Hoist.
- 1—1938 8 yd. Sterling Model 140 Dump Trucks.
- 2—8 yd. Sterling Model RC 140 Dump Trucks.
- 12—Sterling Dump Trucks Model 230C. Rock type dump bodies.
- 3—Model 1 ZWCL Euclid Bottom Dump Truck Tractors—15-ton capacity.
- 6—6-10 yd. Heavy-Duty 1937 Mack Dump Trucks—Heil bodies.
- 2—A.C. Heavy-Duty Mack Dump Trucks—5 yd. capacity.
- 2—1937 Mack Trucks with 4 yd. dump bodies. Heil Hoist.
- 1—3 1/2 Ton Mack Dump Truck.
- 1—3 Ton International Dump Truck—1940 model.

# ECONOMY COMPANY, INC.

**49 Vanderbilt Ave., N. Y. C.**

Tels. MUrray Hill 4-2294-8292-2295-2296



## LOCOMOTIVES

Goodman: All 250 volts.

- 1—10 ton, 31 1-4-T.
- 1—6 ton, 30B, 43" 1—5 ton.
- 1—5 ton, W-1-2, 36".
- 2—5 ton, 2600 K.
- 1—6 ton, 33-1-4-T.
- 2—8 ton, 32-1-4-T.

Westinghouse: All 250 volt.

- 1—4 ton, 902, 43"
- 1—904 c. 44" 500 volt. Also 906 motors.
- 1—10 ton, 915.

Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is  
6 ton 803, 44" as is 5 ton 825, 44" & 36"  
6 ton 823, 44" 8 ton 839 motors  
6 ton 801  
8 ton 839

Battery Locomotives G.E., Ironton and Atlas.

AERIAL TRAMWAYS \* HOISTS \* PUMPS \* MOTORS \* TRANSFORMERS \* BOND WELDERS \* RESISTANCE \* COMPRESSORS \* DUMPS \* SPEED REDUCERS  
FIELD FRAMES \* ARMATURES \* GOODMAN HYDRAULIC SHOVELS \* MOTOR STARTERS AND CONTROLLERS—AC & DC \* DROP BAR SUPPORTS (Goose-  
neck). 29B and 29C \* MINING MACHINE TRUCKS \* SWITCHBOARDS \* CIRCUIT BREAKERS—AC & DC \* CONVEYOR HOISTS \* COAL CRUSHERS (double  
roll) 12"x16", single roll 24"x36", 24"x24" \* ROPE & BUTTON CONVEYOR 400' long \* LATHES, SHAPERS \* SWITCHES \* AUTOMATIC CIRCUIT BREAKERS 250  
volt 600 amps to 2000 amps \* MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps \* HOISTS, overhead, AC 3-60-440, 1 ton and 2 ton \* 1 clam shell bucket 134  
cubic yard. 1—Figure 8 drum \* MINE CARS \* 2 SULLIVAN BIT SHARPENERS \* R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC  
250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine.

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt.  
1—Jeffrey, MH 100, frame only.

## MINING MACHINES

Jeffrey. 35B and 4—28A, 250 V. 4—29B, 29C.  
29CE with shearing head.

Revolving head for 29C.

Goodman. 12A, 12AB, 12AA, 12G3A, 24B.  
1—12G3 250 volt and 2—112 DA, 500 volt.

2—Permissible Type 12CA. 6—112AA.

2—124 E.J.  
Motors for 212AA, both 250 and 500  
volts.

Sullivan, CE7, CE9, CE10. CR10 Low Vein.  
CR5 for middle cutting.

## SUBSTATIONS—275 volts, D. C.

- 2—200 KW G.E. Rotaries (600 volt).
- 2—150 KW West. Rotary.
- 1—200 KW 1—100 KW Ridgway M-G Sets.
- 2—100 KW G.E. Rotary.
- 1—100 KW Allis-Chalmers Rotary.

## SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73,  
29B, 35B and 28A. Goodman  
34B, 30B, 30C, 12A, 12AB,  
12AA, 33-1-4-T, 31-1-4-T. Gen-  
eral Electric 801, 803, 819, 821,  
825, 839. Westinghouse 904, 906,  
102, 907, YR2, 115. Also 200  
KW Westinghouse Rotary Con-  
verter Armature, 250 V Bracket  
Type, 150 KW G. E. HCC Bracket  
Type, and 150 KW G. E., TC  
Pedestal Type.

# GUYAN MACHINERY COMPANY, Logan, W. Va.

## MINING EQUIPMENT READY FOR DELIVERY

### GENERATORS

- 1—100-KW. G.E. type TC-6 Rotary converter  
complete with 2300 volt transformers and  
complete switchboard equipment, 250 volt  
D.C.
- 1—200-KW. G.E. type TC-6 Rotary Converter,  
250 volt D.C. complete with switchboard,  
and extra armature.
- 1—100-KW. Westinghouse, type SK-180, 250  
volt generator with switchboard.
- 1—150-KW. Jeffrey generator, 250 volt, with  
or without switchboard.
- 1—62½ KVA 220 volt G.E. Alternator com-  
plete with switchboard and 100-HP. natural  
gas engine.

### CUTTING MACHINES

- 1—124-AA Goodman Slabbing machine, 250  
volt, top or middle cutter.
- 1—29-C Jeffrey sawmill, 250 volt, top or bottom  
cutter.
- 2—12-AA Goodman shortwalls, 250 volt, with  
or without trucks.
- 1—28-A Jeffrey shortwall, with or without  
truck, 250 volt.
- 4—35-L Jeffrey shortwalls, 220/440 volt A.C.  
less trucks.

- 1—CR-8 Sullivan, 250 volt, with or without  
truck.
- 2—212-AA Goodman machine armatures, 500  
volt.
- 1—23-A Jeffrey machine armature, 500 volt.
- 2—28-A Jeffrey machine armatures, 250 volt.

### LOCOMOTIVES

- 1—6-ton Goodman 30-C Locomotive, 250 volt,  
42" gage.
- 1—5-ton Goodman 30-B Locomotive, 250 volt,  
42" gage.
- 1—5-ton Goodman, type 8-A, locomotive, 250  
volt, 42" gage.
- 1—5-ton Goodman, type 8-A locomotive, 250  
volt, 48" gage.
- 1—8-ton Westinghouse, type 65, 250 volt 44"  
gage.

### MISCELLANEOUS

- 1—Jeffrey Locomotive crab complete, 250 volt.
- 1—16" Steptoe shaper complete.
- 1—35-HP. single drum hoist.
- A.C. motors complete for standard and low  
vein Goodman cutting machines 220/440  
volt.

## ALL-STATE EQUIPMENT CO.

LOGAN, W. VA.

## ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200  
RPM. Pedestal Type, 2300/4000 V., Transformers.  
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy.,  
1200 RPM, form P. 2300/4000 V. Transformers.  
150 KW G.E. SYN. 275 V., HCC, 6 Ph., 60 Cy.,  
1200 RPM, form P. 2300/4000 V., Transformers.  
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200  
RPM. Bracket Type, 2300/4000 V. Transformers.

## MOTOR GENERATORS

500 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph.,  
60 Cy., 900 RPM. Manual Switchgear.  
300 KW G.E. SYN. 575 V. 2300/4000 V., 3 Ph.,  
60 Cy., 1200 RPM. Manual Switchgear.  
200 KW G.E. Ind. 600 V., 2300/4000 V., 3 Ph.,  
60 Cy., 1200 RPM. Manual Switchgear.

## LOCOMOTIVES

15-T WESTGHSE., 250 V. 906-C Mts., 36"-44" Ga.  
13-T WESTGHSE., 250 V., 906-C Mts., 36"-48" Ga.  
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.  
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.  
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.  
8-T WESTGHSE., 250 V., 906-C Mts., 36"-44" Ga.  
8-T WESTGHSE., 500 V., 906-C Mts., 36"-42" Ga.  
8-T GEN. ELEC., 250 V. 839 Mts., 36"-48" Ga.

Each unit listed above is owned by us and  
is available now for immediate purchase.

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## Used Steel Pipe and Boiler Tubes

Steel tanks—steel buildings  
all sizes and kinds  
Valves and fittings.

JOS. GREENSPON'S SON PIPE CORP.  
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## MISC. MINING EQUIPMENT

Mine Cars Engines  
Rail Ties  
Trolley Wire Frogs, bonds  
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Etc.

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All sections of rails and good serviceable second  
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## TROLLEY LOCOMOTIVES and ACCESSORIES

- 1—6-ton Jeffrey Mine Locomotive, armour plate frame, Serial No. 4949, drawbar pull 3,000#, speed 7 M.P.H., track gage 24", wheel location inside frame, wheelbase 40", overall length 149", width frame 44", height above rail 42", approx. weight 13,500#. 2—Type MH-88 motors, 250 volts, MB-16-H Jeffrey controller, equipped with General Electric trailing cable motor and complete equipment. Price.....\$2,000.00
- 1—6-ton Jeffrey Mine Locomotive, reach gear construction, Serial No. 3300, drawbar pull 3,000#, speed 7 M.P.H., track gage 24", wheel location inside frame, wheelbase 40", overall length 150", width frame 43 1/2", height above rail 50", approx. weight 14,000#. 2—Type MH-117 motors, 250 volts, MB-25-J Jeffrey controller, equipped with General Electric trailing cable motor and complete equipment. Price.....\$2,400.00
- 1—6-ton Jeffrey Mine Locomotive, Serial No. 7275, drawbar pull 3,000#, speed 7 M.P.H., track gage 24", wheel location inside frame, wheelbase 40", overall length 140", width frame 46", height above rail 30", approx. weight 13,000#. 2—Type MH-88 motors, 250 volts, MB-25-J Jeffrey controller, equipped with General Electric trailing cable motor and complete equipment. Price.....\$3,000.00
- 1—6-ton Jeffrey Mine Locomotive, Serial No. 7619, drawbar pull 3,000#, speed 7 M.P.H., track gage 24", wheel location inside frame, wheelbase 40", overall length 140", width frame 46", height above rail 30", approx. weight 13,000#. 2—Type MH-88 motors, 250 volts, 37-B Jeffrey controller, equipped with General Electric trailing cable motor and complete equipment. Price.....\$3,000.00
- 1—6-ton General Electric Mine Locomotive, Serial No. 10432, drawbar pull 3,000#, speed 7.5 M.P.H., track gage 24", wheel location inside frame, wheelbase 60", overall length 148", width frame 32 1/2", height above rail 32 1/2", approx. weight 13,000#. 2—Type HM 801 motors, 250 volts, B-62-A Gen'l. Electric controller, equipped with Gen'l. Electric trailing cable motor and complete equipment. Price.....\$3,000.00
- 5—4-ton Jeffrey Mine Locomotives, Serial No. 4316, drawbar pull 2,000#, speed 7 M.P.H., track gage 24", wheel location inside frame, wheelbase 36", overall length 148", width frame 45 1/2", height above rail 33", approx. weight 9,500#. 2—Type MH-96 motors, 250 volts, MB-24-D Jeffrey controller, equipped with Gen'l. Electric trailing cable motor and complete equipment. Price.....\$2,000.00 each

All above locomotives are in good operating condition and are in operation at present. All are equipped with good headlights, steel tired wheels, trolley pole and wheel, interlocking automatic transfer switch for changing from pole to trailing cable. They are being offered for sale for reason of changing mine haulage from trolley to battery locomotive.

### MOTOR GENERATOR SETS:

- 1—50 K.W., No. 217500, 250 V., 200 amp. compound wound, 850 RPM Westinghouse D.C. Generator, direct connected to Gen'l. Electric 75 HP, 2200 V., 865 RPM, 19 amp. No. 1414622, Type KTR 356, Form B Induction Motor. Price.....\$300.00
  - 1—100 K.W., No. 1714156, 250 V., 365 amp. Type SK compound wound Westinghouse direct current generator built on common shaft with 150 HP, S-17155221, 2200 V., 31.8 amp., 900 RPM Westinghouse Synchronous Motor. Motor excitation from generator. Price.....\$2,000.00
  - 1—200 K.W., No. 468125, Class 6 250 750, Type MPC, Form LO, 250 volts, 800 amp., 720 RPM Gen'l. Electric direct current generator direct connected to Crocker Wheeler synchronous motor No. 114271, Type 301810, 290 HP., 2300 volts, 3 phase, 350 K.W., 87 amp., 720 RPM., .75 lead power factor, 60 cycle motor. Motor exciter on generator shaft extension. Gen'l. Electric continuous current generator No. 462404, Type KS 3, 24 amp., 125 volts. Price.....\$4,000.00
- New Parts and Cable Reel Equipment—approx. value.....\$6,000.00

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- 15 ton, 22' x 9' Truck Scale . . . \$ 440.00
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- 20 ton, 34' x 10' Truck Scale . . . \$ 815.00
- 3 ton Tipple Scale . . . \$ 135.00
- 3' x 6' Single Deck Screen . . . \$ 495.00
- 3' x 8' Double Deck Screen . . . \$ 685.00
- Double-Roll Coal Crusher . . . \$ 345.00

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Visit our factory. Inspect several models in operation. Immediate delivery.

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Myers Whaley Loader, C-7 Sullivan Shortwall Cutters, G. E. Battery & Trolley Locomotives, Incline & Apron Conveyors, #220 Page Diesel Dragline, 3 yd. 100 HP Electric Hoists, Miscell. Deep Shaft Pumps, 100 KVA Diesel Generating Plant.

Standard Coal Mining & Converters Corp.  
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## COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING  
LONG DISTANCE PHONE—34

TERRE HAUTE, INDIANA  
LOCAL PHONE—CRAWFORD-5493

### FOR SALE

- 1—Vulcan 4 foot Drum Hoist 125 HP Motor DC
- 2—Vulcan 48 inch Drum Hoist 125 HP Motor DC
- 1—Vulcan 32 inch Drum Hoist 50 HP Motor DC
- 1—Vulcan 28 inch Drum Hoist 35 HP Motor DC
- 1—Vulcan 27 inch Drum Hoist
- 1—Vulcan 27 inch Drum Hoist 50 HP Motor DC
- 2—Vulcan 24 inch Drum Hoist 35 HP Motor DC
- 6—Sullivan CE-7 Cutting Machines 250 Volt DC
- 250—Rebuilt 2 1/2 Ton Card Iron Works Mine Cars
- Timkin Bearing Equipped

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| Morgan Gardner   | 4 Ton |
| Goodman          | 6 Ton |
| General Electric | 8 Ton |

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- 100 K.W., 1200 R.F.M., 50 volt, d.c. Westinghouse Rotary Converter with Transformers and Switchboards
- 200 K.W., 550 volt, G.E. Converter
- 3—165 KVA, 6800 volt, G.E. Rotary Trans.
- Primary Fuse Expulsion Cutouts
- 1/R 7 x 7 Portable Air Compressor
- 450 H.P., 2300 volt, 3 phase, 60 cyc. G.E. Synchronous Motor Panel complete
- Distribution and Current Transformers
- 5 ampere, 110 volt, Watthour Meters
- Oil and Manual Air Circuit Breakers
- 200, 300 & 600 A, Disconnecting Switches
- 5 ton Reading Multiple Gear Hoists

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FOR SALE: 3/4", 1", 1 1/4", 1 1/2" Plow and IMPROVED PLOW STEEL ROPE, up to 8000 ft. lengths, NEW and slightly used, 6x7 and 19 Construction, WIRE and hemp centers, for DRAG LINES, Haulage, Dredging, Hoisting, Guys, etc.; ATTRACTIVE PRICES: 1000 KW Schy. Motor Generator Set; 650 CFM DIESEL Air Compressor; 500 HP NEW Mine or Incline MOTOR, complete; 150 HP LARGE Single drum Electric Hoist, with or without motor; DIESEL and Uniflow Engines, with or without generators.  
FS-304, Coal Age, 520 N. Mich. Ave., Chicago 11, Ill.

### FOR SALE ALL OR IN PART

Sand and Gravel Plant, including Jaw Crusher, Gyratory Crusher, Conveyors, Vibrating Screens, Sand Classifiers, Extra Heavy Scrubber, Water Pumps, Sand Pumps, Feed-O-Weights, Weightometers, Trestle and Tripper and Auxiliary Equipment.

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Approximately 9 miles of Conveyor, complete with belting, pulleys, troughing and return idlers and drive equipment.

All offered subject to prior sale.

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12x12 Deane Holyoke Vertical triplex single acting pump, brass fitted, steel split herringbone gears, 100 HP 230 volt, D.C. motor and starter. Completely overhauled and in first class condition.

American Well Works 5" 650 GPM pump 14 ft. T.P.H. with 5 HP. 230 volt DC motor. In first class condition.

Cement gun complete with trucks, tank, 13x8 compressor, motor, etc.

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Bay City, Mich.



## PROMPT SHIPMENT FROM OUR WAREHOUSE

### MINING MACHINES

4-13 DA 50 HP 250 v. Goodman Shortwall  
35 B Jeffrey 250 v. 5' cutter  
13 GS Goodman AC Shortwall, 220/3/60.

### STORAGE BATTERY LOCOMOTIVES

2-6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors, Type LSBE Class 2CS From C9. 13 1/4" long, 50" high, 60" wide and 44" wheel base. Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

1-5 to 5 1/4 Ton Type D Ironton, 36 or 42" Ga. Low Type.  
1-5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.  
4 Ton 36" Ga. Atlas.  
4 Ton 36" G.E. (2 motors).

### (Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.  
13 Ton Westgh. 500 v. 40" Ga.  
10 Ton Jeffrey 500 v. 36/42" Ga.  
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.  
2-8 Ton G. E. 500 v. 42/44" Ga.  
2-6 Ton G.E. 250 v. 42/44" Ga.

### SCREENS

2-4' x 5' single deck Tyler Hammer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

Rotary Con. & MG Sets (3 ph. 60 cy.)  
2-300 KW G.E. HC 12 Rotary 275 v. 6 ph. with 2300 v. 3 ph. Trans.

200 KW Rids. 275 v.—300 HP Rids. 2200 v. Syn.  
150 KW G.E. 275 v.—225 HP G.E. ATI 2200/4000 v.  
100 KW G.E. 275 v.—150 HP G.E. ATI 2200 v.  
75 KW G.E. 125 v.—125 HP G.E. IK 220/440 v.  
75 KW 275 v. G.E.—125 HP Al. Ch. 220/440 v.

### ENGINE GENERATOR & TURBINE SETS

100 KW 250 v. DC Westgh.—Skinner Engine.  
65 HP Primm Oil Engine belted to AC or DC Gen.  
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Tur.  
50 KW West. 125 v. DC—Skinner Engine.  
50 KW 125 v. DC West. Turbo Gen.

### TRANSFORMERS

Qu.	KVA	Pr. V.	Sec. V.
31	7 1/2		
74	10		
28	50	22000	2200

### HOISTS

100 HP American sgl. fr. drum—AC Motor  
75 HP Lidgerwood sgl. fr. drum—AC or DC Motor  
50 HP Thomas sgl. fr. drum—AC or DC Motor  
30 HP Carlin double dr. fr.—AC or DC Motor

### COAL CRUSHERS

18 x 24 and 18 x 30 New Scottsdale dbl. roll

### SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 41
300	West.	1750	S.R.	CW
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
200	West.	900	S.R.	Syn.
187	G.E.	600	S.C.	I-L
150	G.E.	600	S.R.	CW
150	West.	375	S.R.	CCL
150	West.	600	S.C.	CW
125	Al. Ch.	720	S.C.	
100	West.	1750	S.R.	
100	Al. Ch.	690	S.R.	
100	G.E.	700	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
50	G.E.	1200	S.C.	KT
40	Triumph	1800	S.C.	TR 11

Other sizes down to 1 HP

### DC MOTORS—230 VOLTS

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109
130	G.E.	550	ser.	CO 1812
100	G.E.	480	ser.	MD 108
100	G.E.	950	cp. wd.	RC
60	West.	1750	cp. wd.	SK
60	G.E.	600	ser.	CO 2507
50	Reliance	1500	cp. wd.	185 T
60	Cr. Wh.	700	cp. wd.	CCD
25	West.	600	cp. wd.	SK 190
25	Reliance	850	cp. wd.	185 T

### AC MOTORS

150 West. 585 S.C. CS

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- 8—Hopper, Twin, 50-Ton
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- 50—Hopper, Side-Discharge, 50-Ton
- 50—Refrigerator, 40-Ft., 40-Ton
- 16—Refrigerator, 36-Ft., 30-Ton
- 50—Box, 40-Ft., 40-Ton
- 12—Box, Automobile, Steel, 50-Ft., 50-Ton
- 10—Dump, Major, Automatic, 30-Yd., 50-Ton; lift doors
- 2—Dump, Western, Automatic, 30-Yd., 50-Ton; lift doors
- 3—Dump, Western, 20-Yd., 40 & 50-Ton; steel floors
- 1—Dump, K&J, RR-door, 37-Yd., 50-Ton
- 6—Gondola, 50-Ton, High-Side, Steel
- 10—Tank, 8000-Gallon, 40 & 50-Ton
- 5—Flat, 40-Ft., 50-Ton. AB Brakes

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- 1-13 Ton Jeffrey, 250 V, steel frame.
- 1-10 Ton GE steel frame, 250 V, HM-830-A motors.
- 1-6 Ton West, bar steel frame with 904-C, 250 V motors.
- 1-6 Ton Jeffrey, MH-88 motors, any gauge.
- 2-6 Ton GE with HM-823 motors.
- 1-5 Ton GE ready to operate, 42" ga.
- 2-5 Ton Goodman 250 V, 38" ga.
- 1-4 Ton Jeffrey MH-86 motors.

### COAL CUTTING MACHINES

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- 1-35B Jeffrey 250 V shortwall.
- 1-35BB Jeffrey AC shortwall.
- 1-35B Jeffrey 500 V shortwall.
- 1-12DA Goodman, 50 HP, 250 V D.C.
- 1-12G3 Goodman, shortwall, 3/60/220 V, A.C.
- 1-12AB Goodman shortwall, 250 V, D.C.
- 1-36B Jeffrey, 250 V, 14" high.

### MISCELLANEOUS

- 1-165 HP GE Syn. 2200 V, 900 RPM motor.
- 2-150 KW Syn. M-G Sets, 250 V.

Send us a list of any equipment you may have for sale.

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## DeLaval Steam Turbine and Centrifugal Pump Unit

Turbine-Type TC #30209, Steam Pressure 150, Speed 1170, Exhaust Pressure 28" Vac. Pump—Type 2 P6—Total head 286, Speed 1170. Gallons per minute, 1050. Cheap For Quick Sale.

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75 H.P. Excellent Condition

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2—Ironton 5-ton Storage Battery Locomotives

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- 2—Sullivan CR 2—Shortwall Machines 250 volts D.C.
- 10—Jeffrey 35 L—Shortwall 220/440 volts A.C.
- 1—Sullivan Air Compressor Class WL 44, 210 C.F.M.

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1-16 Yd. Electric Caterpillar Modern Dragline with 160' Boom.

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- (7) Steam 60 ft., 300 ft., 600, 1000 & 1940 ft.
- (12\*) Belted 300, 676, 870, 1000, 1300 ft.
- (12) Diesel 105, 315, 520, 676 & 1000 ft.
- (6) Electric, 1300, 1,500, 2200, 3000, 5000 ft.
- (14) Gasoline, 10, 160, 220, 210 & 370 ft.

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## TANKS:

12,000 and 15,000 gal. and 20,000 gal.

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- 2 1/2 ton Whitcomb 24 ga. New Batteries
- 3-5 ton Mancha 30 in. ga.
- 4-6 ton G.E. 36 in. ga.
- 3-7 ton Goodman 36 ga. Battery & Trolley
- 8-9 ton Baldwin Westgh. 42 ga. & 36 ga.

## DIESEL GENERATOR:

480 KW 3-60-2300 v. Cooper Bessemer

## TROLLEY LOCOMOTIVES:

4-6 ton & 3-5 ton Goodman 36 ga.

3-5 ton Goodman 42 ga.

5-6 ton Westinghouse 42 ga.

10 ton Goodman 42 ga. & 13 ton Jeffrey

## VIBRATING SCREENS:

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2 Robins Gyrex 4x8 1/2

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2 yd. P. & H. Model 780 75' Boom Diesel Dragline

2-2 1/2 yd. 48B Diesel Shovel-Drags

2 yd. Page 70' Boom Diesel Dragline

1 1/4 yd. Marion 450 Elec. Shovel

5-120B-4 yd. Elec. Shovel-Drags

25 ton Browning 50' Boom Loco. Crane

## MINE LOADERS:

H23 Sullivan Tunnel Loader

3-5 BU & 7 BU & 12 BU 36 or 42 ga. Joy

7 Conway 20A, 30A, 50A, 60 & 75 Muckers

5-Gardner Denver & Elmcov Shovels

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5'x60' Traveler Rotary Dryer

Clamshell Buckets 3/4, 1, 1 1/2 & 2 yd. Cap.

30 ton & 12 ton Vulcan St. Ga. Gas. Loco.

40 on Porter S.T. Locomotive

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Complete Mines-M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers, Mine Loaders

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- 1-Goodman type 724 E J 250 volt. 9 ft. Cutter Bar with two chains, adjustable from 35" to 77" cut.

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- 21" x 8' LeBlond H.D. Q.C. M.D.

## RADIAL DRILLS

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- 6' Cincinnati Bickford Radial M.D.
- 7' Cincinnati Bickford Radial M.D.
- 5' American Triple Purpose Plain.

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STORAGE BATTERY

## LOCOMOTIVES

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Greensburg, Penna.

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Belting...Elevator Belting...Fire,

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RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE  
NEW, GUARANTEED & LOW PRICED

## CONVEYOR BELTING

### ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

## TRANSMISSION BELTING

### HEAVY-DUTY FRICTION SURFACE

Width Ply	Width Ply	Width Ply
18" - 6	10" - 6	6" - 5
16" - 6	10" - 5	5" - 5
14" - 6	8" - 6	4" - 5
12" - 6	8" - 5	4" - 4
12" - 5	6" - 6	3" - 4

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## ENDLESS "V" BELTS

- "A" WIDTH All Sizes
- "D" WIDTH All Sizes
- "B" WIDTH All Sizes
- "E" WIDTH All Sizes
- "C" WIDTH All Sizes Sold in Matched Sets

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### PROTECT THAT PLANT

## FIRE HOSE

### APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

### AIR HOSE

I.D. Size	Length	per Length	Couplings
1/2"	25 feet	\$5.00	\$1.50 Pair
	50 "	10.00	1.50 "
3/4"	25 "	6.25	2.50 "
1"	50 "	12.50	2.50 "
	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE  
All Prices-Net-F.O.B. New York

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## PIPE-MACHINERY-GAS ENGINES AIR COMPRESSORS-DIESELS-PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

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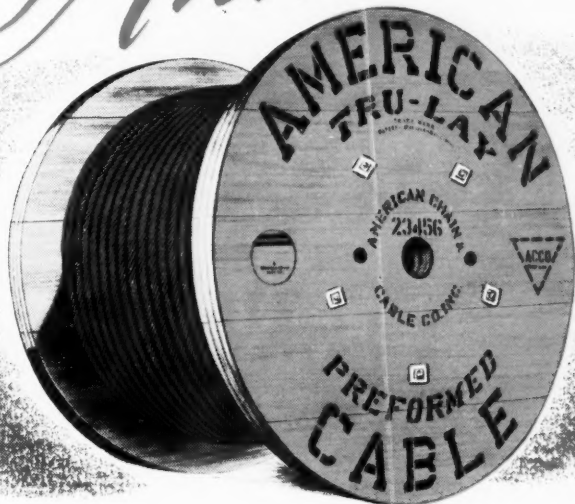
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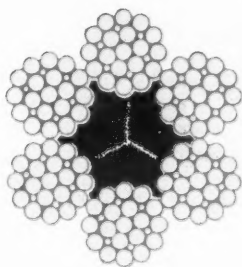
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*Announces*



*Still Further Improvement*  
**in TRU-LAY PREFORMED I.P.S.\***



**ALL GREEN LUBRICATED**

• Years ago American Cable introduced preformed —the first basic improvement in wire rope in nearly a century. Since then, **TRU-LAY Preformed** has set the service pace for *all* wire ropes.

Now, **TRU-LAY Preformed**, of Improved Plow Steel,\* is an even better rope because of a proven superior **GREEN** lubricant. This green lubricant is made to our specifications and has greater adherence —it protects the wires better—helps them to wear longer. This superior lubricant is literally "*stuffed*" into every strand so that every wire is covered and every void between wires is filled. **TRU-LAY's** Green Lubricant is your assurance that the best wire rope is now much better.

**ACCO**

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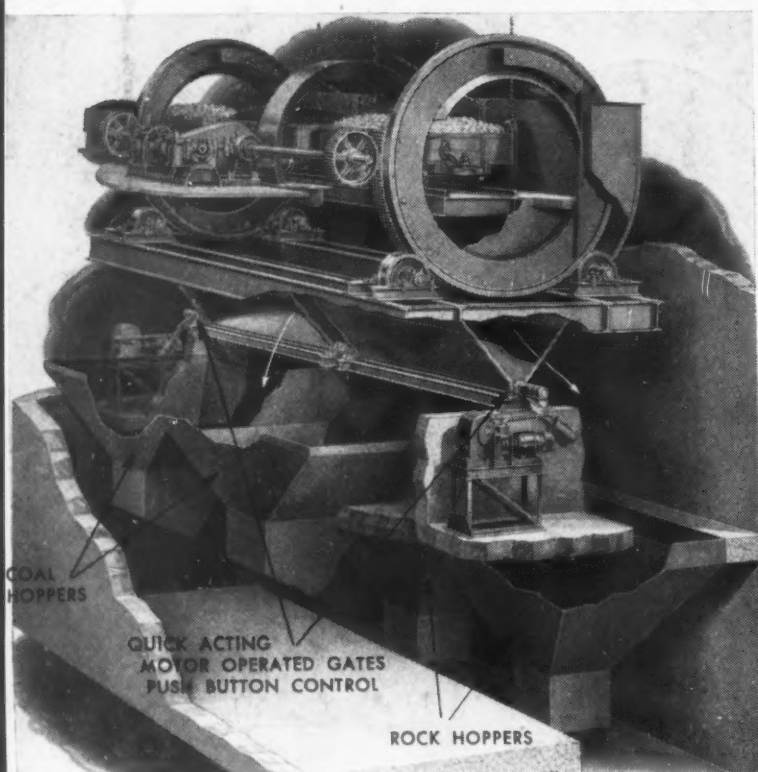
**AMERICAN CABLE DIVISION  
AMERICAN CHAIN & CABLE**

*In Business for Your Safety*





# Assure Fast, Uninterrupted Movement of Mine Cars With **LINK-BELT** CAR DUMPERS and CAR HAULS



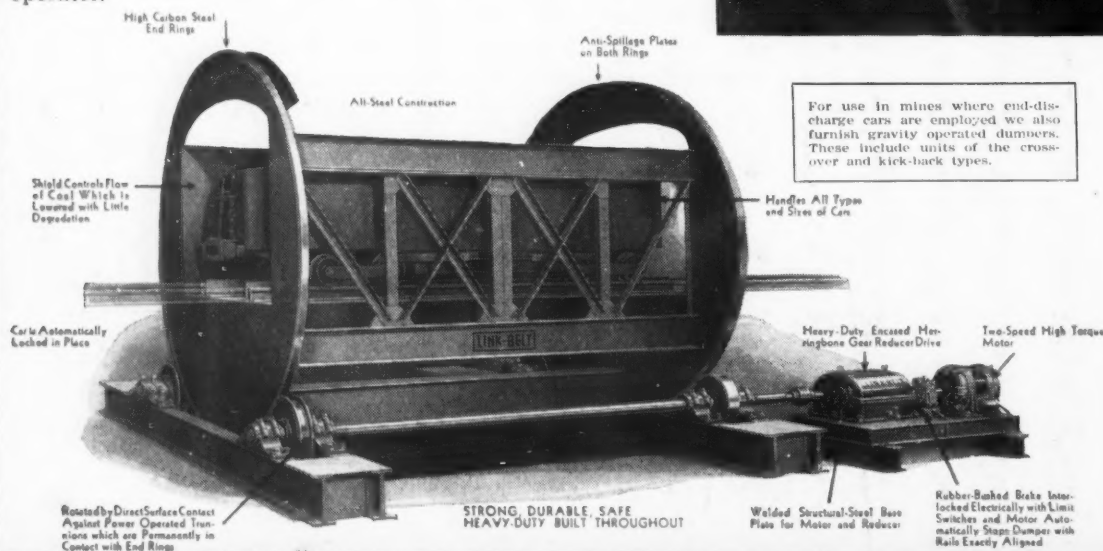
● Speed up your dumping operations, reduce degradation and cut maintenance costs with a rugged Link-Belt fully automatic, electrically-operated rotary dumper. Link-Belt has standardized designs on many types of mine car dumpers. The chances are most favorable that one of these standard time-tested units will meet your requirements. This line includes units for dumping mine cars in train or uncoupled. Made in sizes to accommodate one or more cars at a time, (up to 10 cars) with capacities from 2 to 10 tons per car.

## LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.



Above and right. Link-Belt gear-driven, revolving type dumper and auxiliary equipment. This 2-car dumper, in combination with the motor-operated fly gates illustrated above, provides for properly discharging any combination of two cars, loaded with rock or coal, to the coal and rock hoppers respectively. The dumper revolves through an angle of  $135^\circ$  in either direction, automatically reverses and stops in upright position. Counter-weighted chains wrap around the cars and hold them firmly on the rails when dumping. The trip of mine cars is handled through the dumper by a rope haulage engine. This engine, the dumper and the motor-operated fly gates are controlled by a single operator.



Left. Link-Belt traction type full-revolving dumper for swivel-coupled mine cars. One man controls the complete operation. Through a push button or lever, the dumper is automatically started, slowed down to facilitate easy, gentle unloading and stopped with tracks in line to receive incoming cars. Cars are automatically held down in place completely turned over and discharged cleanly without spillage. Thoroughly protected by safety devices.